NATIONALGEOGRAPHIC.COM/MAGAZINE NOVEMBER 2005

NATIONAL GEOGRAPHIC

The Secrets of Living Longer

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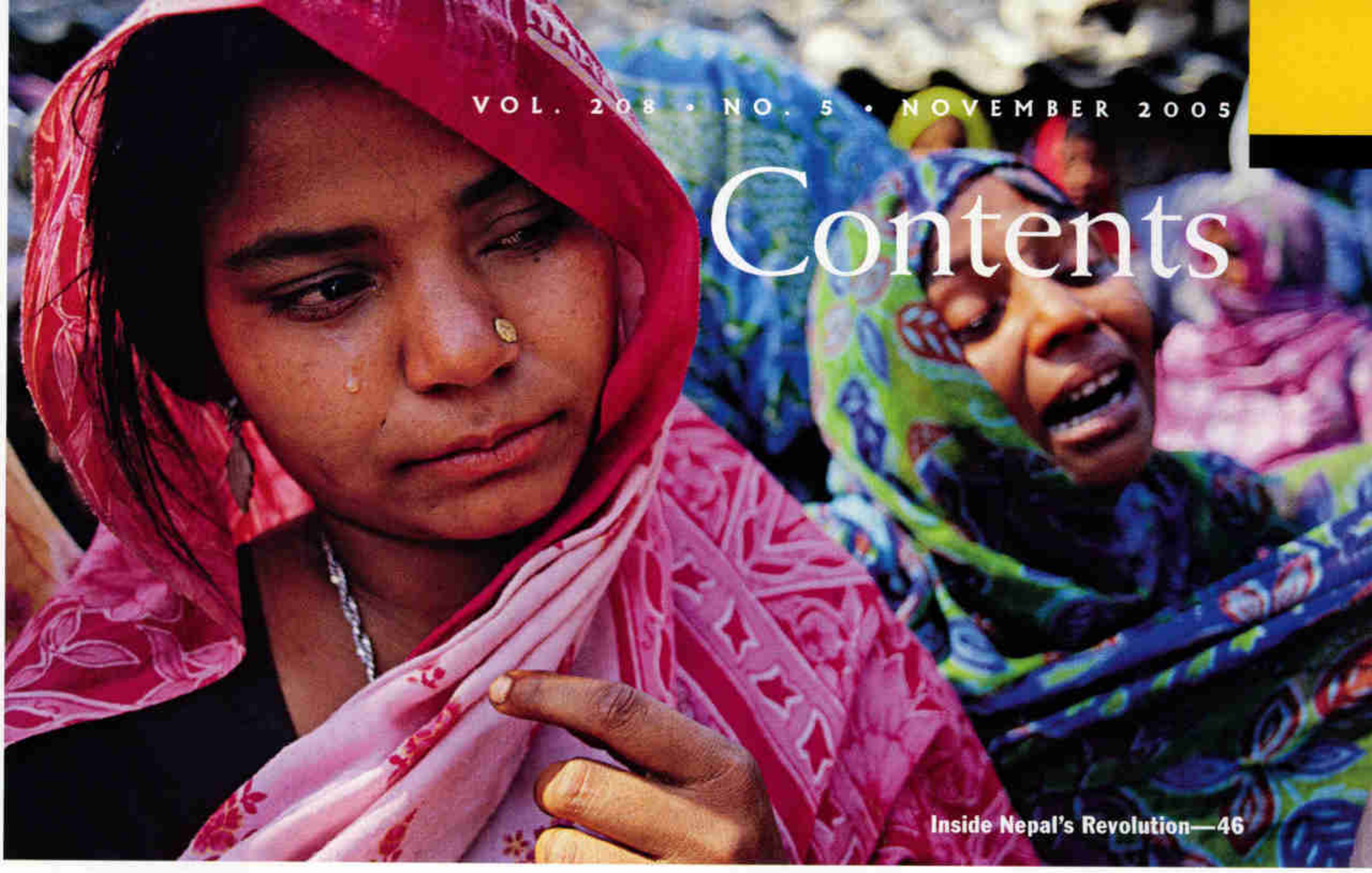
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THE COVER

Yoga every morning helps Fumiyasu Yamakawa, 84, stay in great shape.
BY DAVID McLAIN

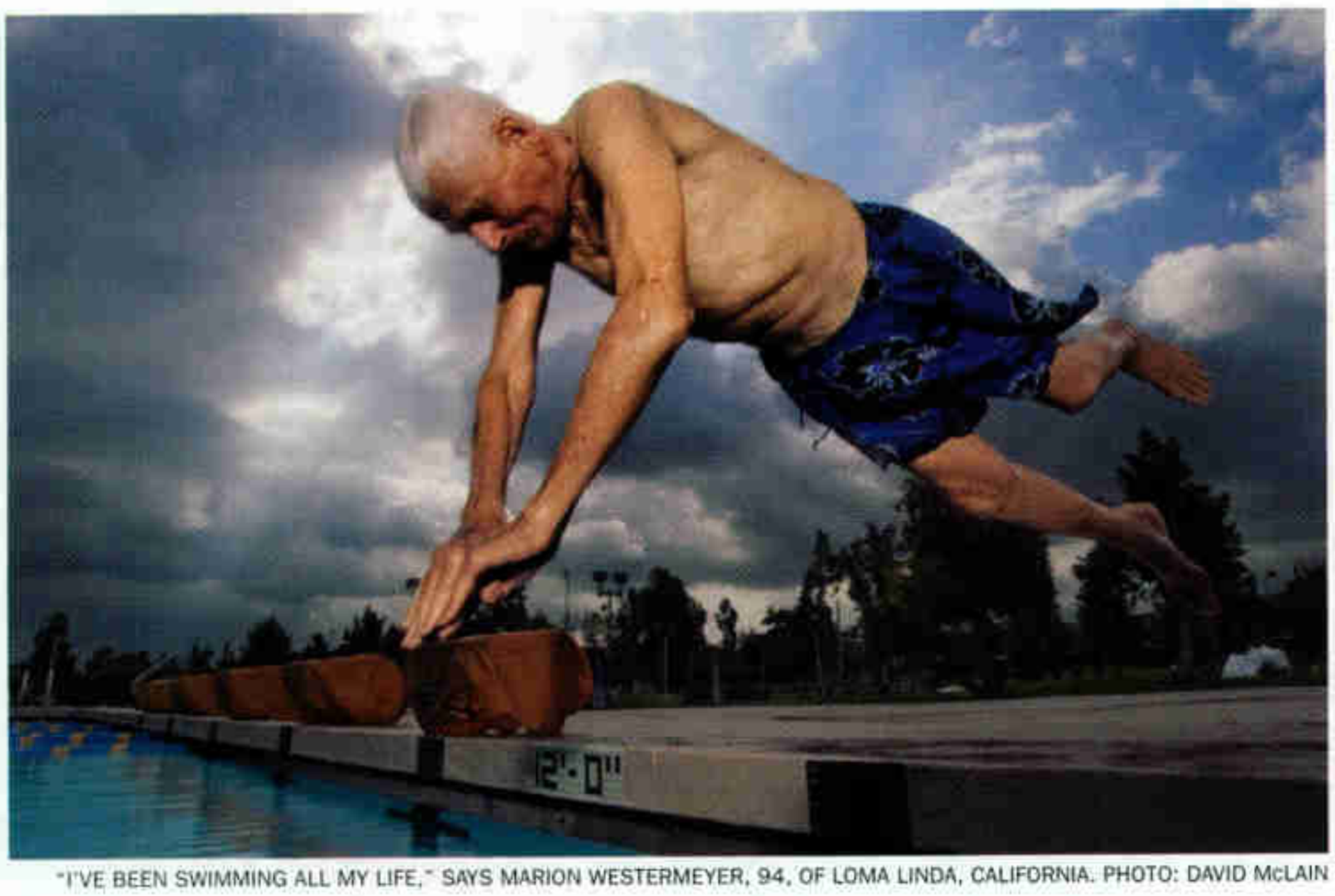
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From the Editor



"I'VE BEEN SWIMMING ALL MY LIFE," SAYS MARION WESTERMEYER, 94, OF LOMA LINDA, CALIFORNIA. PHOTO: DAVID McLAIN

More than 50 centenarians were interviewed for this month's cover story. When the interviews were over, author Dan Buettner realized "there hadn't been a grump in the bunch."

Is congeniality the secret to longevity? Unfortunately, as Dan's text and David McLain's photographs reveal, it's not that simple.

We yearn to live if not forever, then at least for a very long time. Literature is full of dealmakers with immortal longings—think of Faust and Dorian Gray. Historical figures, like the Spanish explorer Juan Ponce de León, searched for the fountain of youth, convinced that it held the secret to staying young.

Perhaps he was on to something: The Seventh-day Adventists of Loma Linda, California, who rank among America's longevity all-stars, promote drinking at least five glasses of water a day. The Sardinians, who also have more than their share of centenarians, opt for red wine. On the other hand, the long-living Okinawans regularly drink green tea.

Can green tea, followed by a chaser of red wine and five glasses of water, extend our lives? Can we drink, eat, or exercise our way to longer life? Answers, complex but fascinating, can be found in our article. In the meantime, start your own quest for longevity by easing up on the grump quotient. You, and everyone around you, just might live longer.



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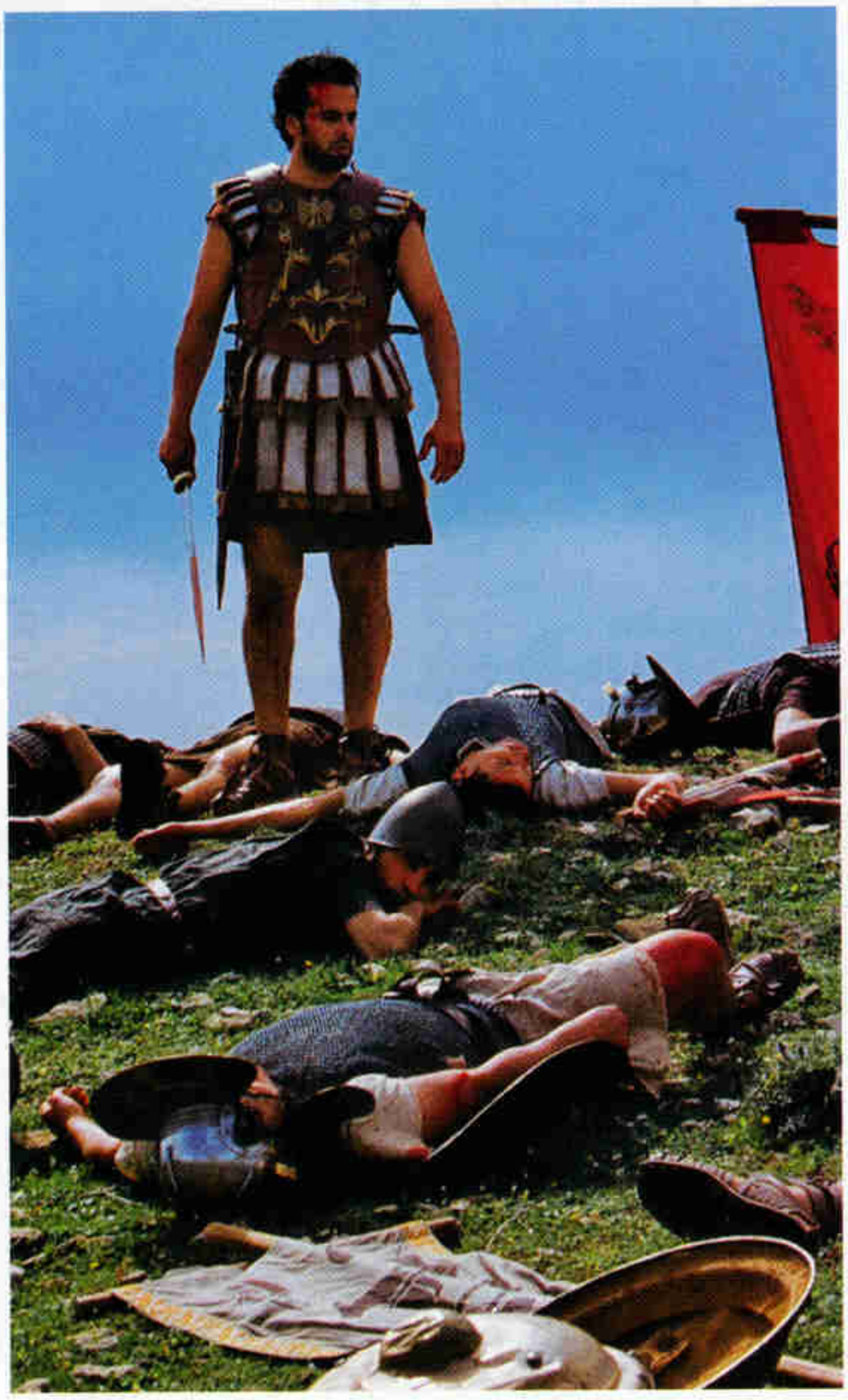
NATIONAL GEOGRAPHIC CHANNEL

SUNDAY, OCTOBER 30
9 P.M. ET/PT

Hannibal v. Rome

Rome had never faced anyone like Hannibal. In 218 B.C. the African general led an army of infantry, cavalry, and war elephants out of Cartagena, Spain, and headed for central Italy. They marched over the Pyrenees and the Alps to take Rome's formidable military forces by surprise.

This two-hour special uses the latest technology and the expertise of archaeologists and historians to re-create Hannibal's legendary journey. Who was this driven warrior? Find out why and how Hannibal marshaled his campaign against Rome, almost destroying the powerful republic. Experience his trek over the mountains and learn about the audacious attack that still influences military planners today.



MONDAYS
AT 8 P.M. ET/PT

Is It Real?

Sea monsters swim in the deeps of lakes. Holy men fly through the air. Something mysterious leaves messages in the form of crop circles (below). Crazy? Don't be too sure. The line between fact and fantasy, science and science fiction, comes into focus in this new National Geographic Channel series. *Is It Real?* takes a close look at what lies behind some very weird phenomena.



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Behind the Scenes

GEOGRAPHIC BEE

Against the Odds

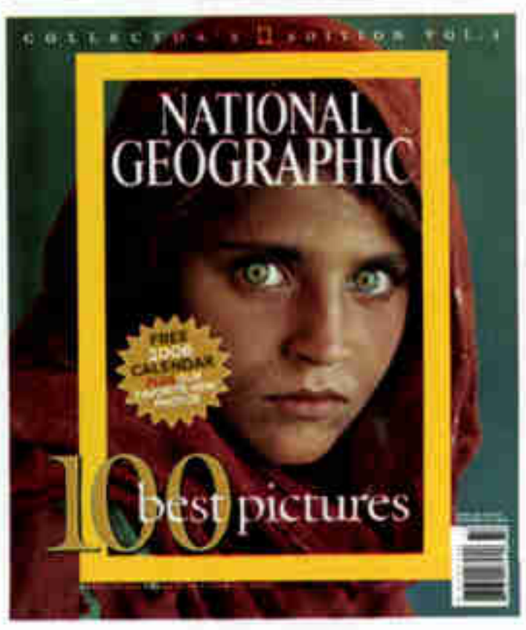


Geography is a snap for Nicholas Clemons (above) of California. A voracious reader with an impeccable memory, the San Francisco 14-year-old won his school's National Geographic Bee and placed fifth in his state's competition—without really studying. "It sort of came naturally," explains Nicholas. But not everything has been so easy for this middle schooler.

"Nicholas has been in shelters and group homes for most of his life," says his teacher Karen Anzaldo. After winning his school's Bee in front of more than 800 people, the teenager said he felt "on top of the world"—and it showed. "Nick threw his arms into the air. He looked just like Rocky Balboa up on stage," Karen recalls. His teachers then rallied around him to send him to the state Bee in Sacramento to represent his city and his school.

The triumphs didn't end there. As word spread of his impressive showing at the Bee, the *San Francisco Chronicle* did a story on Nicholas. This past summer, after demonstrating in the article an uncanny knowledge of San Francisco transit lines, he won an internship with a city transportation office. And Nicholas gained admission to Gateway High School, a charter school for high achievers, after writing about his experience at the Bee in his application. He's now in his freshman year there.

"There has been a huge turnaround in his relationship with himself," says Karen, his teacher, of Nicholas's Bee success. "It's been a life-changing event."

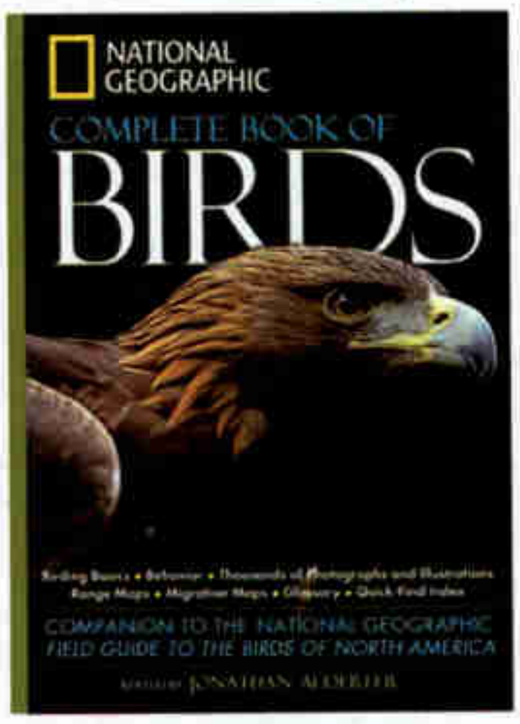


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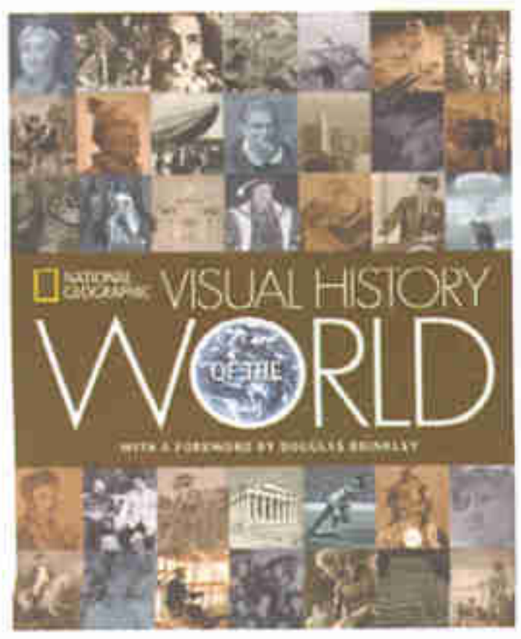
Our Best to You Illustrations editors sifted through more than a century's worth of NATIONAL GEOGRAPHIC photographs to collect the most memorable images. Now the photos they found are back by popular demand. The magazine's *100 Best Pictures* is being re-released this month in time for the holiday season. The collector's edition, which now includes a 2006 calendar and extra photos, will be available for a limited time at bookstores and newsstands, or can be ordered at *ngm.com/100best*.

BOOK RELEASE

Birder's-Eye View Every bird species nesting on the continent—and those just passing through while migrating—are featured in *National Geographic Complete Birds of North America*, a comprehensive 640-page resource including birds' habits, habitats, migration routes, and more ($35).



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TOP LEFT: VICTOR JOSÉ COBO

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THROUGH A PHOTOGRAPHER'S EYE

Visions of Earth

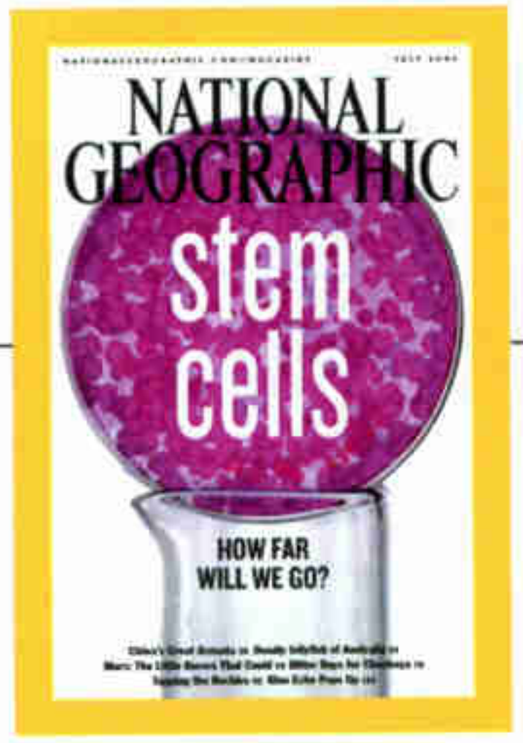


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To show magnetism in action, I used an inch-wide drop of ferrofluid—magnetic particles suspended in liquid—which is actually a pretty ugly glob of stuff. I put the sample on a glass slide atop a yellow Post-it note and held up a green birthday card to reflect another color. Then I arranged magnets beneath the slide to see what would happen. As the particles responded to the magnetic field, the fluid flowed into this organic-looking form. It's not high-tech, and I don't really see it as art. It simply communicates science in a new way. —*Felice Frankel*

▶ Decorate your desktop with this image of magnetic fluid, in Fun Stuff at ngm.com/0511.

Forum



July 2005

Many of you weighed in on the debates presented in "The Stem Cell Divide" and "Tapping the Rockies." We also got mail on photographs in the issue—the fetus in the stem cell article, the funeral procession in Chechnya, the deer hunters in the Rockies. Although divided over whether or not you liked the images, you were united in how much they moved you.

The Stem Cell Divide

I wept as I read your article on stem cell research. My beloved husband, David, died of pancreatic cancer in January. If stem cell research can lead to cures for this terrible disease, we should be exploring it with a ferocity of focus. To think that a potential cure is blocked by politicians is truly inhumane.

ROBIN POLLETTA
Northville, Michigan

The idea of destroying a living human embryo is profane and repugnant in the extreme. Your story says, "With more and more countries aggressively developing stem cell therapies, the United States is in real danger of being left behind." On the contrary, the United States is setting an ethical standard by asking whether destroying human life to save human life is morally justified.

V. MICHAEL JAMES
Alexandria, Virginia

I am a Catholic with type 1 diabetes, and I steadfastly believe in the sanctity of human life—even in the fetal stages. I also believe just as firmly that, after birth, there is an equal right to a decent quality of life. To me, not using the stem cells of embryos, which would be disposed of anyway, for research purposes is foolishness on a grand scale.

EMMA THOMPSON
Desford, Leicester

I have strong feelings about stem cell research, so I was interested in how it would be covered in the magazine. I was not prepared, however, for the disturbing images. The photo of the child's head described as a "museum specimen" was appalling. It is not the type of NATIONAL GEOGRAPHIC photos I have been accustomed to seeing.

LAURA JONES
North Little Rock, Arkansas

I must congratulate you on this issue, which I found exemplary in its use of photography to illustrate a story and to provoke thought. The photos used in "The Stem Cell Divide" were at the same time beautiful, disturbing, intimate, and informative.

LYNETTE SEELMEYER
Fort Collins, Colorado

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Bitter Days for Chechnya

None of your photographs have touched me on such a personal level as the one of the funeral procession of the young boy. I am thankful that your publication is unafraid to step beyond the sterile boundaries we have raised for ourselves to show what is really going on around us.

KEITH POOL
Castle Rock, Colorado

We find the spread of the dead body of Georgy Daurov to be profoundly disturbing. While the image certainly grabs attention, sensationalism is a poor criterion for editorial selection in a periodical of NATIONAL GEOGRAPHIC's stature.

CYNTHIA AND KENT SEYMOUR
Mill Valley, California

Until reading this article, I had no emotional connection to the conflict. That was until I saw the eyes of Markha Mutalipova [page 90].

JEFF SHAVER
Lloydminster, Alberta

I was disappointed by the idealized description of Chechen rebel fighters. Your article avoids



mentioning the genocide, kidnappings, and enslavement of the Russian population, billions of dollars in stolen Russian money, and attacks on Russia's military bases.

PAVEL YAKOVLEV
Morgantown, West Virginia

The Chechen struggle is ignored by the West, and it doesn't help when you characterize Chechen acts as "terrorist" and not label Russian brutality the same way.

MOHAMMAD BABAR
Fort Smith, Arkansas

I am one of the patients featured on pages 24-5 of the stem cell story and wanted to point out an error in your article. My stem cell transplant for lupus was not done at the University of Massachusetts but rather at Northwestern Memorial Hospital in Chicago, where Dr. Richard Burt, chief of immunotherapy for autoimmune diseases, designed the protocol, performed the transplants, and continues yearly follow-ups on my progress. His team pioneered the use of stem cells for autoimmune diseases and performed the first stem cell transplants in the world for a variety of autoimmune diseases. I write this letter to express my gratitude to Dr. Burt for his efforts in starting this field and for his genuine care for me.

KATHERINE HAMMONS
Belleville, Michigan

Editor's Page

Your editorial seemed reasonable and balanced right up to the penultimate sentence, at which point I was stunned to discover that there is a "friction between science and ethics"—as if science is itself not ethical. In fact, good science is ethical to the core, with the basic principles of beneficence and nonmaleficence firmly entrenched in all we do.

MARTIN MENDELSON, M.D., PH.D.
Rockville, Maryland

I have a friend who used to trek with us. Now he can barely walk. The cause: multiple sclerosis. He has tried therapies, but there is no let up in the spread of the disease. Hope awakened when I saw the picture of Dean Richardson, also a victim of multiple sclerosis, standing tall on the Editor's page.

NIRLEP SINGH
Bhatinda, India

FROM OUR ONLINE FORUM
nationalgeographic.com/magazine/0507

Many of you wrote in about Dean Richardson. We are happy to report that he continues to do well, living pain- and medication-free with no active signs of multiple sclerosis.

China's Great Armada

Like every child in China, I grew up listening to stories about the voyages of Zheng He in history

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class. Reading about him again in your eloquent article with its powerful images brings back many memories and makes him become real.

ZHIYIN COHLMEYER
San Leandro, California

The point has been made delightfully in your article that the world's most populous nation has made and will continue to make dynamic strides to strengthen trade.

BATHI KASTURIARACHI
North Canton, Ohio

Your article on Zheng He gave him the recognition he deserved, placing him beside great Western names like Columbus, Magellan, and da Gama. However, the article did not mention British naval officer Gavin Menzies, who brought Zheng He to the attention of the West. He suggested in his book *1421* that the Ming fleet may have been the first to circumnavigate the globe.

SOLOMON HOASJOE
Toronto, Ontario

Though Gavin Menzies' book about Zheng He reaching the Americas has been popular, most experts agree that there is no strong evidence for such an assertion. For our story, we used historical and archaeological source material.

Tapping the Rockies

Your article on gas and oil development in the Rockies captured the concerns of not only environmentalists but also hunters, anglers, ranchers, and others who are worried about our fish, wildlife, clean air, clean water, and Western way of life. Certainly our nation needs energy, but we do not need to sacrifice our last wild places to irresponsible gas and oil development. It's time our leaders devise more prudent, balanced policies that include alternative and renewable sources of energy, as well as more efficient ways of extracting and using energy.

COREY FISHER
Missoula, Montana

I hope NASA continues to have success with missions to Mars, and one day an astronaut can walk up to one of the rovers, pat it on the back, and say "great job."

"Tapping the Rockies" illustrates the significant resource, both public and private, that is fueling economic development in the Rocky Mountain West. Several states are enjoying tax revenues that support local schools and counties. Here in Teton County, we've been precluded from developing federal gas and oil on public land, much to the detriment of our school system and county.

DAN LINDSETH
Choteau, Montana

You missed a great opportunity to present a balanced and informed article on energy development. Your article ignored the federal government's long-standing commitment to protect the environment while providing clean energy for the nation. Natural gas is used to heat homes, make everyday products, and produce clean electricity. Demand is rising worldwide, and development is limited to the few places where natural gas is both abundant and accessible. For the record, most federal lands do not fit into this category, but where they do, development is temporary and occurs with strict stipulations for environmental protection.

REBECCA W. WATSON
Land and Minerals Management
Department of the Interior
Washington, D.C.

Report From the Red Planet

Your article made me feel as if I were right there on Mars with the rovers, cheering them on. I hope NASA continues to have success with missions to Mars, and one day an astronaut can walk up to one of the rovers, pat it on the back, and say "great job."

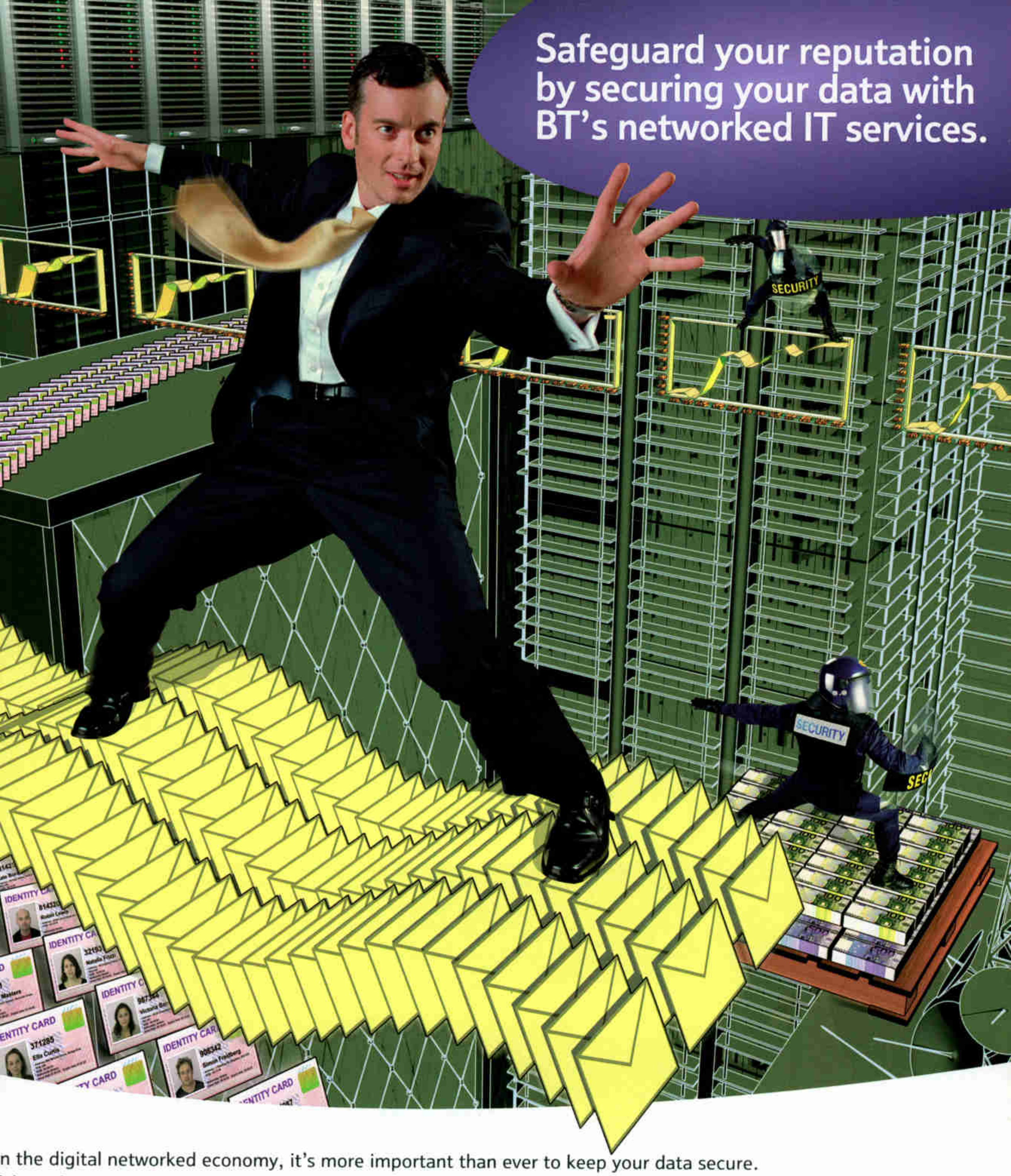
THOMAS DISCORDIA
Webster, Massachusetts

ZipUSA: Glen Echo, Maryland

I lived in Glen Echo during World War II and was pleasantly surprised to learn that Glen Echo Park lives on as a haven and inspiration for artists. As a child I learned to swim at the park's huge swimming pool, and I fondly remember good times in the fun house and riding the bumper cars, roller coaster, and carousel. In my time there, the town was also well known as the home of Clara Barton, founder of the American Red Cross.

RICHARD A. RICHMOND
Winchester, Massachusetts

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In the digital networked economy, it's more important than ever to keep your data secure. A breach in security can impact your day-to-day operations, affect customer confidence and harm your reputation. In fact, three out of four companies now appreciate the importance of securing critical data.* And with the rise in email and instant messaging, combined with regulatory compliance requirements about protecting and storing data, many companies are rethinking their information management policies.

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*IDD Research, Jan 2005. †Figure based on the top 20 companies in the Fortune 500 as compiled by Fortune magazine.

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HEALTH

The End of a Scourge?

Guinea worm's scheduled disappearance

There's no vaccine. There's no cure. You can't develop immunity to the disease caused by this three-foot-long parasite the width of angel-hair pasta.

For millennia—as long as people have waded into lakes and ponds to draw water—guinea worms have afflicted humans. Today the demise of the worm and the crippling disease it causes may be in sight. But as health workers confront the world's last cases, their jobs are becoming even harder. To eliminate the final holdouts of the disease, health workers must change the behavior of people in some of the poorest, most neglected places on Earth.

The target date for ending guinea worm disease, once set for 1995, is now 2009. If that date holds, guinea worm could be the second disease (after smallpox) and the first human parasite eradicated in history. The Carter Center, which since 1986 has led the initiative to stop the scourge, reports that only about 16,000 cases remain, all in Africa.

Guinea worm larvae live in tiny crustaceans often referred to as water fleas. When people drink water contaminated by the fleas, their digestive systems destroy the fleas but not the worm larvae, which continue to mature. Male worms die after mating inside their human hosts; females grow ferociously, averaging almost an inch a week. In about a year the worm slowly emerges headfirst, usually from somewhere in the lower legs or arms of the carrier, and causes disabling pain that keeps students from school and farmers from their fields.

KAREN KASMAUSKI

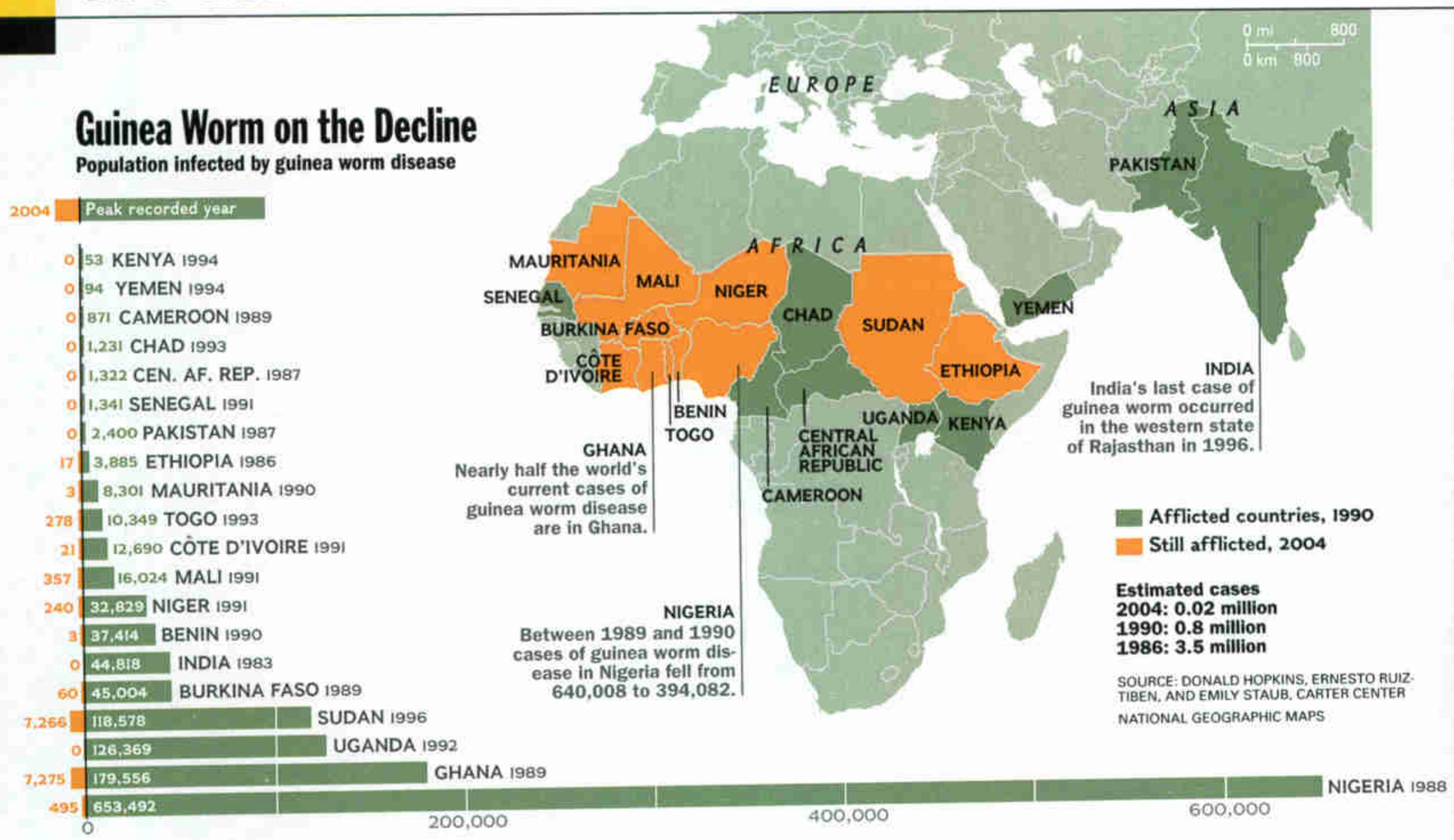
APHICA

CREATURES OF OUR UNIVERSE

A woman in Mali washes dishes in her village's only water supply, a stagnant lake once infested with guinea worm larvae that sickened the community.

Guinea Worm on the Decline

Population infected by guinea worm disease



The wounds through which the worms come out, inch by excruciating inch, drive sufferers to the nearest lake or water source to immerse their sores. When the worms sense the water, they release hundreds of thousands of larvae. The water fleas eat the larvae—and the cycle continues.

In 1900 guinea worm was found throughout most of Africa, the Middle East, and Central and South Asia. As access to safe drinking water spread, the worm disappeared from many regions. Yet by the mid-1980s there were still an estimated 3.5 million cases in Asia and Africa. To get rid of the disease, health workers focused on a simple strategy: Teach people to filter what they drink (even a piece of muslin can do the job) and keep those with emerging worms out of the water. As people passed along these low-tech methods, often from woman to woman, the worms died out.



Once a guinea worm's head emerges through the skin of its carrier, the worm is pulled out little by little each day. The painful process can take up to three months.

KAREN KASMAUSKI

Mali's results are typical: Guinea worm cases plummeted from 10,000 to fewer than 400 in 14 years. But progress was delayed in Sudan and Ghana, which now account for 90 percent of all cases. A 22-year-long civil war that ended earlier this year kept health workers from reaching much of southern Sudan. And eradication efforts in Ghana stalled after ethnic fighting broke out in 1994. To get Ghana's campaign back on track, female health care volunteers started going house to house in 2002; by early this year reported cases had dropped 60 percent.

Until guinea worm is completely gone, health workers across Africa will have to remain vigilant—a single infected person could reinfect several villages. "You can't turn your back," says the Carter Center's Aryc Mosher, who is based in Ghana. "The moment you do, it will flare up again." *—Karen E. Lange*

Former President Jimmy Carter discusses the guinea worm project. Search for Challenges for Humanity at **ngm.com**.

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Blue waterproof tarps covering figures at Easter Island's Ahu Tongariki site are part of a joint Japanese-Chilean project—one of many efforts to preserve the island's statues.

CULTURE

Easter Island's Statues at Risk

Weathering imperils centuries-old carvings

The great stone faces are showing their age. For some six centuries, beginning a thousand years ago, the Rapa Nui people of Easter Island carved images of their ancestors into the island's soft volcanic tuff. The sculptures—called *moai*—probably started wearing away soon after the statues were dragged from the tuff quarry to their platform sites, some of which are miles away. But years of exposure to wind, water, and human activity have sped the deterioration.

At Ahu Tongariki, largest of Easter Island's moai sites, the 15 statues have already been through a lot. Feuding Rapa Nui began toppling and breaking the figures, which weigh as much as 98 tons, in the 17th century, and a 1960 tsunami washed the scattered stones hundreds of feet inland. When archaeologists started reconstructing Ahu Tongariki in 1992, it was a rubble pile. They hoisted the broken pieces upright, then cemented them together. Recently the mended moai were covered with tarps (above) to allow them to dry. A water repellent was then applied to prevent further erosion—but the coating is expected to last only a few years.

"It's sad but unfortunately true that existing methods cannot preserve all the statues," notes UCLA archaeologist Jo Anne Van Tilburg. Since 1981 she's compiled more than 12,000 images, along with historical, ethnographic, and excavation records, of the island's 887 moai. "The Rapa Nui community and their scientific advisers have some hard choices to make," says Van Tilburg. "Statues containing the most valuable scientific or historical information can and must be saved." —*Kristin Weichman*

GEO NEWS

HEALTH

■ **Women feel more pain—and feel pain more—than men,** notes a new study. The sexes' coping strategies may hint at why. Men in the study focused on physical aspects of discomfort, which apparently helped increase pain thresholds. Women focused on pain's emotional as well as physical aspects. Their pain proved harder to treat and seemed of greater intensity.

ANIMAL KINGDOM

■ **Yellowstone's grizzlies no longer need Endangered Species Act protection,** says the U.S. government. About 200 bears lived in the region when they were first listed as threatened in 1975. The population has since tripled, but some experts worry that the slated 2006 delisting is premature.

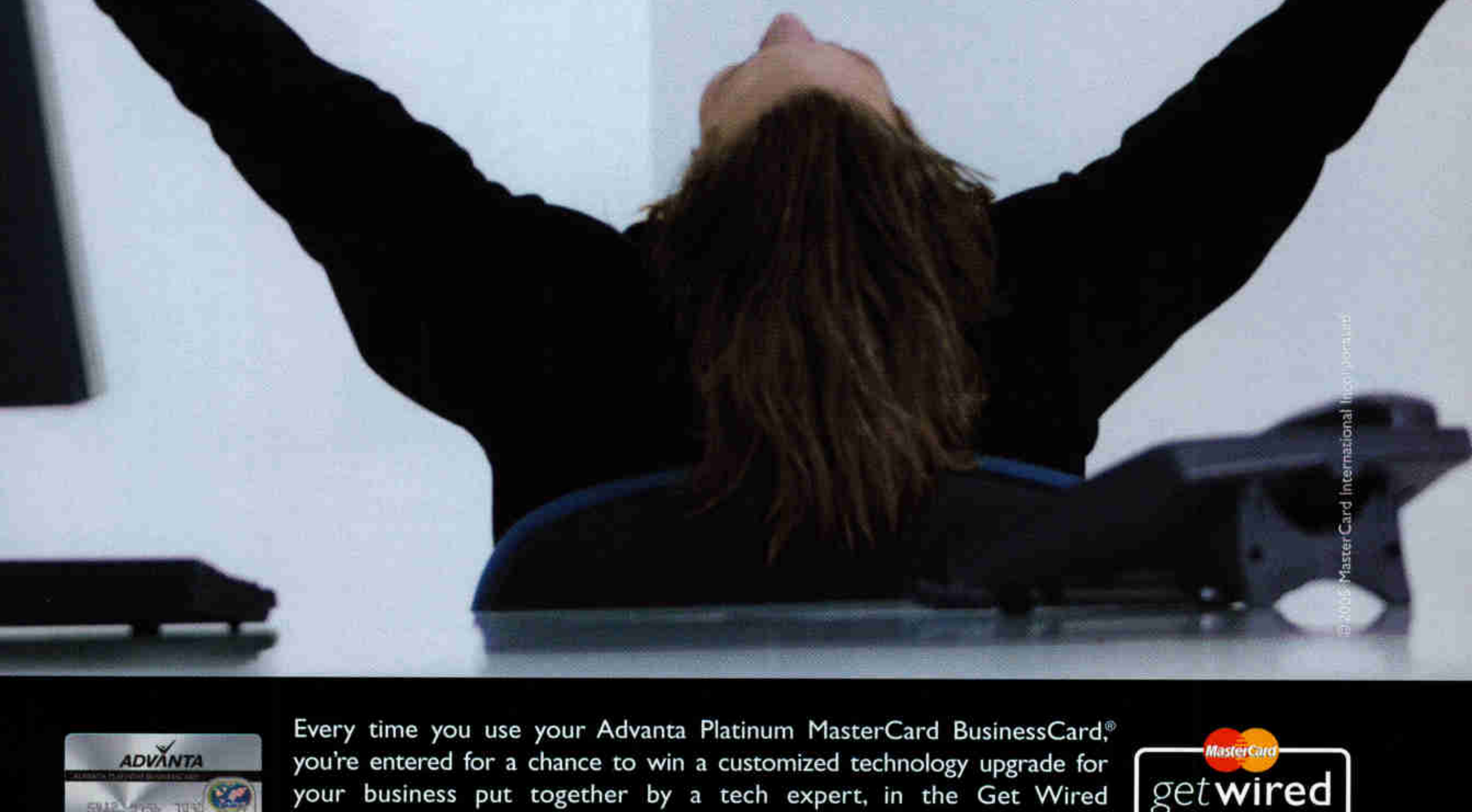
ASTRONOMY

■ **A new planet with three suns in its sky** has been found 149 light-years from Earth. Its type is named Tatooine after the dual-sunned planet in the film *Star Wars*.

PHOTO BY DON COUCH

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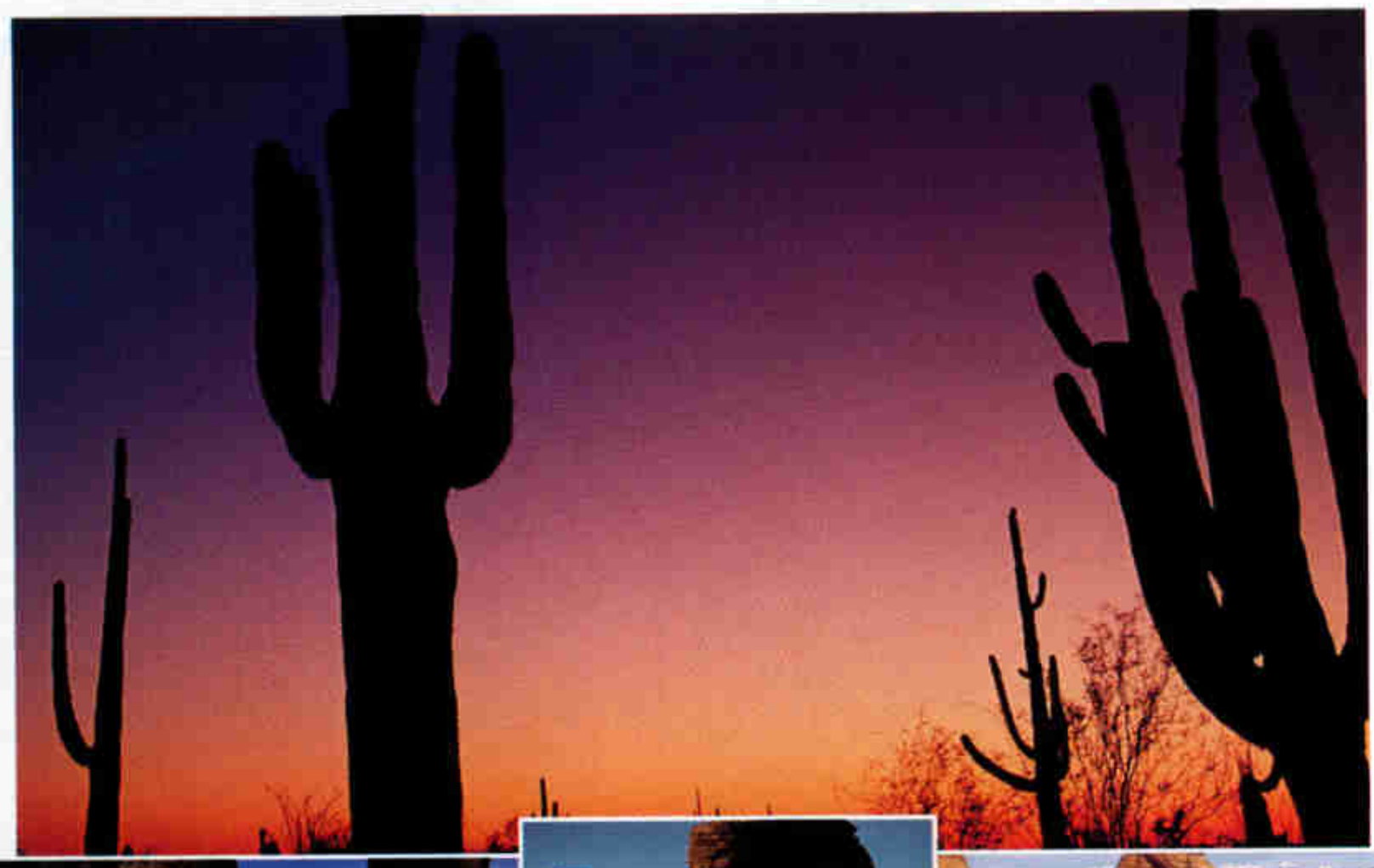
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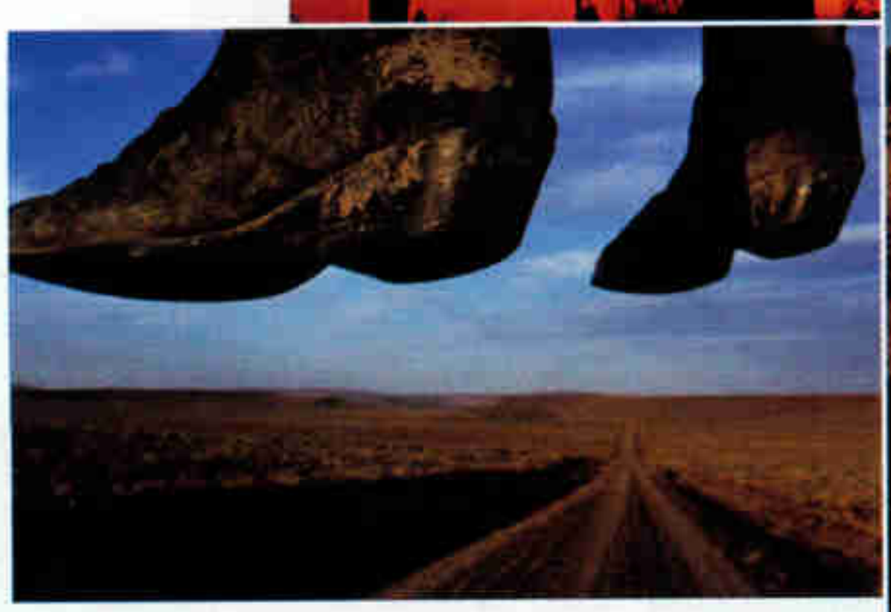
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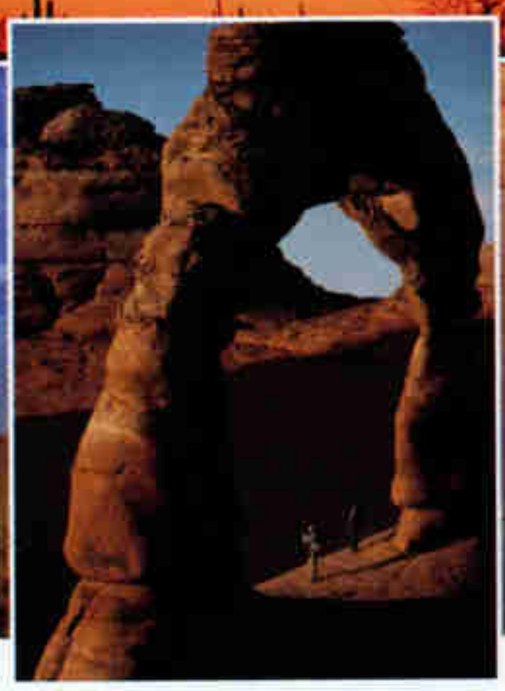
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GREAT JOURNEYS *of the* WORLD









Photographing the American Southwest

"IT'S DEFINITELY A PHOTOGRAPHY WONDERLAND out there," says *National Geographic* photographer Joel Sartore. The dramatic landscape of the American Southwest has seduced photographers and artists for decades. Its stunning red-orange vistas, wide-open sky, and towering rock formations create a visual treat that sometimes seems almost out of this world. "It's one of the best places on the face of the Earth," says Sartore, who has explored the Southwest with his camera on many occasions. "Photography is all about light, and out there, there is wonderful color in the light," he says.

Among his favorite locales are New Mexico's Santa Fe; the red hills of Ghost Ranch, where Georgia O'Keeffe painted; and Arches National Park near Mojave, Utah. "I also love the sandstone rocks in Bryce Canyon, Utah. They have different patterns, shapes, and interesting erosion. It looks like a John Wayne movie when you're shooting that sandstone," says Sartore. When it comes to getting that winning shot, he recommends taking pictures either during sunrise or sunset. "Get up early, stay up late, and take the middle of the day off," says Sartore. He also suggests shooting anyplace where there are no mountains to block the view. And the best time of year? "I would avoid going into the desert during the height of summer, but other than that, anytime, just anytime."

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Special cells inside facial pits of pythons (like the green tree pythons above and below), pit vipers, and boas are capable of sensing even tiny changes in infrared energy, which helps the snakes target prey—and avoid predators.

NATURAL HISTORY

A Snake's Sixth Sense

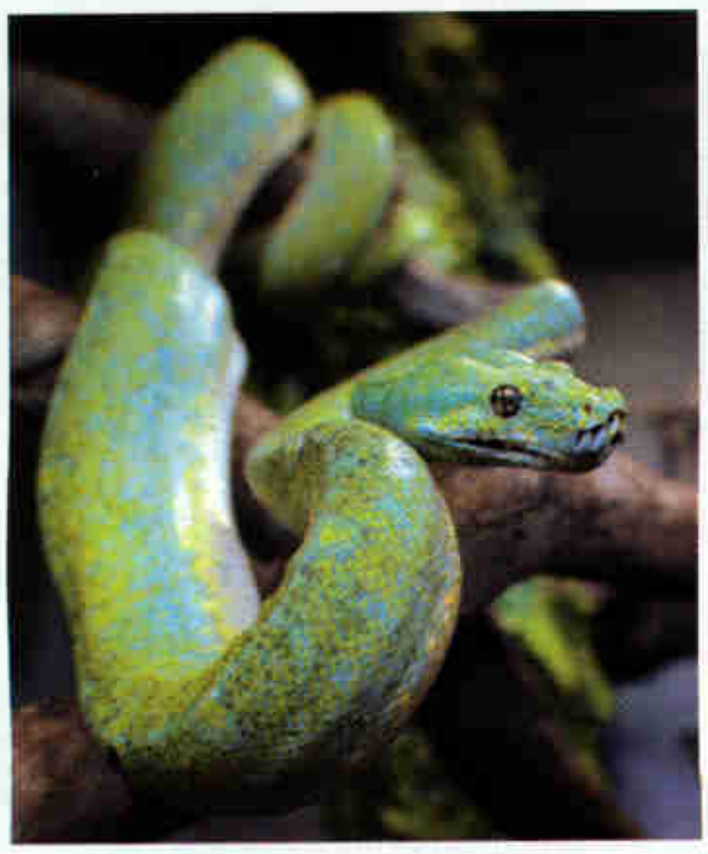
Unique "pit organs" detect minuscule shifts in energy

Snakes are very sensitive—really. New research is revealing the workings of a unique sensory organ in pythons, boas, and pit vipers that is likely "the single best infrared-detecting system on Earth," claims biologist Michael Grace of the Florida Institute of Technology.

Infrared radiation is energy emitted both from living and inanimate objects—often at levels imperceptible to humans. But some snakes can "see" that heat, like humans see different intensities of light, via facial pits filled with infrared-sensitive receptor cells. These pit organ cells are wired to send data to the brain much as the eye's retinal cells do, detecting thermal shifts as minute as .003°C. Combined with visual cues or alone, this ability to distinguish warmer from cooler lets the snakes strike at prey, dodge predators, and find basking spots with amazing precision. "They get a very detailed view of their environment," says Grace.

Technologies mimicking the snake sense may be used to pinpoint everything from military targets to leaky pipes in oil refineries to early stage tumors in the body, Grace says, "anything with a distinct thermal signature."

—Jennifer S. Holland



WHAT IS IT?

The St. Wenceslas crown, commissioned in 1347 for King Charles IV of Bohemia, which is now in the western part of the Czech Republic

What's it made of? Five pounds of gold and gems: 20 pearls and 96 precious stones, including what may be the largest rubellite in the world.

Why the name? St. Wenceslas is the patron saint of Bohemia. He's also the "good king" of Christmas carol fame.

Where can I see it? You can't. It's locked up in Prague's St. Vitus Cathedral. Following Charles IV's dictates, the crown jewels are rarely on exhibit. They've been publicly displayed only ten times in the past century, most recently in 2003 to mark the tenth anniversary of the Czech Republic.

Who can unlock the crown's vault? The Czech president and the archbishop of Prague are among seven key holders who must be present—or send a deputy—whenever the chamber is to be opened.

Why all the fuss? Though the reign of the last king of Bohemia ended in 1918 with the formation of Czechoslovakia, the crown is a key symbol of Czech sovereignty.

The crown's monetary value? Priceless. *—Cate Lineberry*



J. HOLLAND (TOP AND LEFT); JAN GLOC, PRAGUE CASTLE ADMINISTRATION

IF YOU'RE GOING TO RUN OUT OF SOMETHING,
LET IT BE AIR, NOT FILM.

When he was 12 years old, David Doubilet placed a Kodak Brownie Hawkeye camera into a rubber bag and began shooting life underwater off the coast of New Jersey. Today, he is one of the world's leading underwater photographers. David often stalks his photographic prey for hours underwater, painstakingly lighting them under conditions photographers above sea level can't even imagine. It is through David's eyes and brilliant lighting techniques that the monochromatic world beneath the sea has been discovered and colorfully presented to those living so far above its surface.



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PASSION FOR ACHIEVEMENT



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In 1904, Georges supported South Pole explorer Captain Jean-Baptiste Charcot on his historic trek as the first Frenchman to reach the Antarctic. Charcot marked the moment, naturally, with a bottle of Cordon Rouge. Fast forward nearly 100 years to this year when five adventurers, led by team leaders Tom Avery and American-born Matty MacNair, carried a bottle of Mumm Cordon Rouge to the North Pole, crossing 420 miles of ice in 37 days. Their achievement disproved the critics who had claimed Robert E. Peary's similar journey and 1909 world record, could not have been attained in 37 days.

Top Photo: 2005–Tom Avery celebrates with his team after successfully re-creating Robert E. Peary's disputed record run to the North Pole in 37 days

Bottom Photo: 1904–Captain Jean-Baptiste Charcot's expedition to the South Pole toasts their achievement on Bastille Day



PHOTO: MARTIN HARTLEY

CHAMPAGNE

MAISON FONDÉE EN 1827

G.H. MUMM

À REIMS - FRANCE



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NATURAL HISTORY

A Mother's Fury

While the camera rolls, a cornered tigress attacks

The tiny village in Assam in northeastern India had already lost three cows to the tigress and her two cubs. Rangers from nearby Kaziranga National Park, which claims one of the densest tiger populations in India, managed to tranquilize and move the weaned cubs to another part of the park but missed the mother.

Within a few days she had killed another cow, and villagers spent a sleepless night tracking her down. In the morning four rangers mounted elephants and began to close in. The tigress charged the nearest elephant, leaping and clawing the handler's forearm, ripping the skin from his hand, and breaking two fingers with her bite.

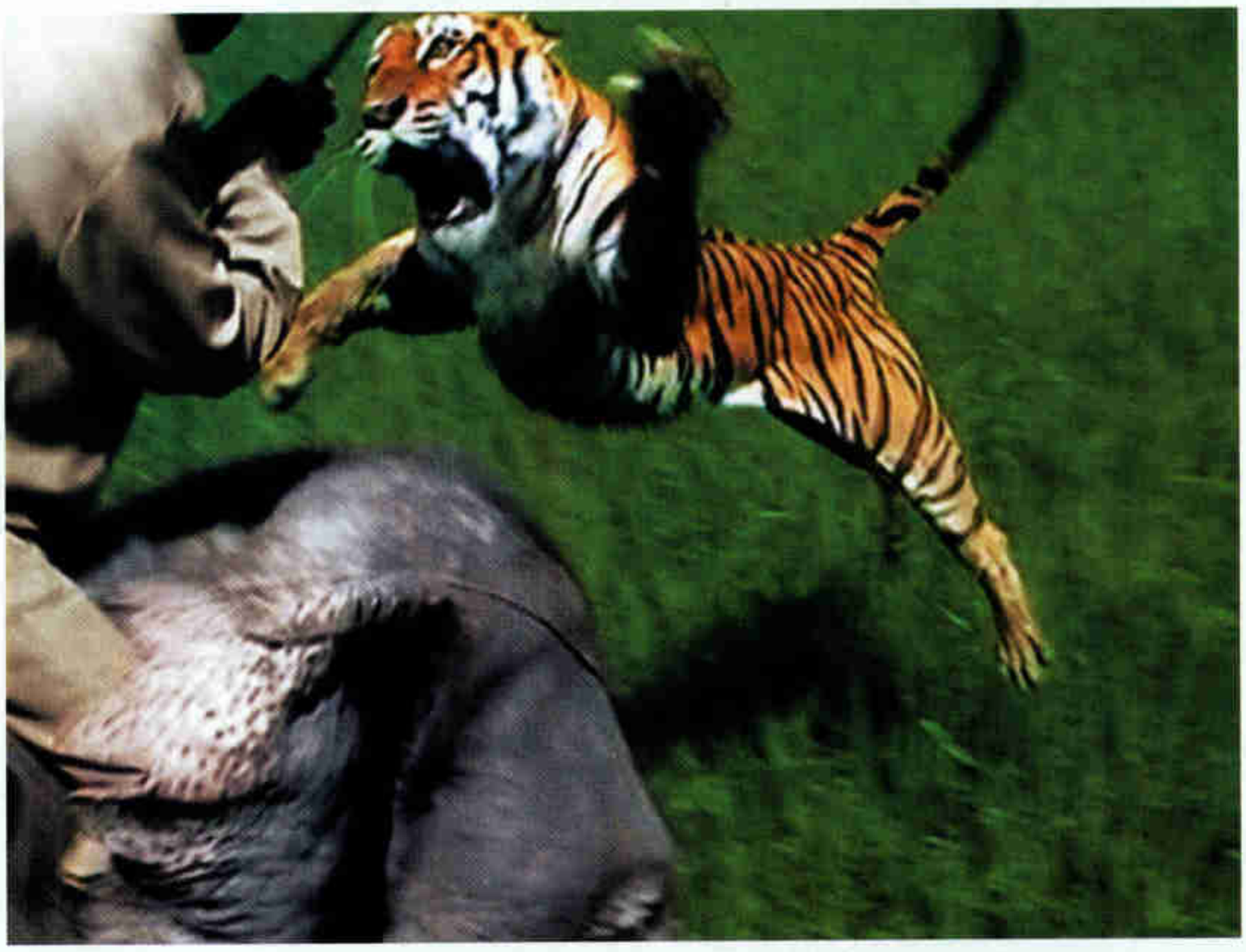
Recording a tiger attack is rare, but ranger Ranjan Kumar Das videotaped the assault from five feet away. Das says he was able to keep rolling because his elephant is blind in her left eye and couldn't see the action. "Once she realized what was happening, she ran helter-skelter," he says.

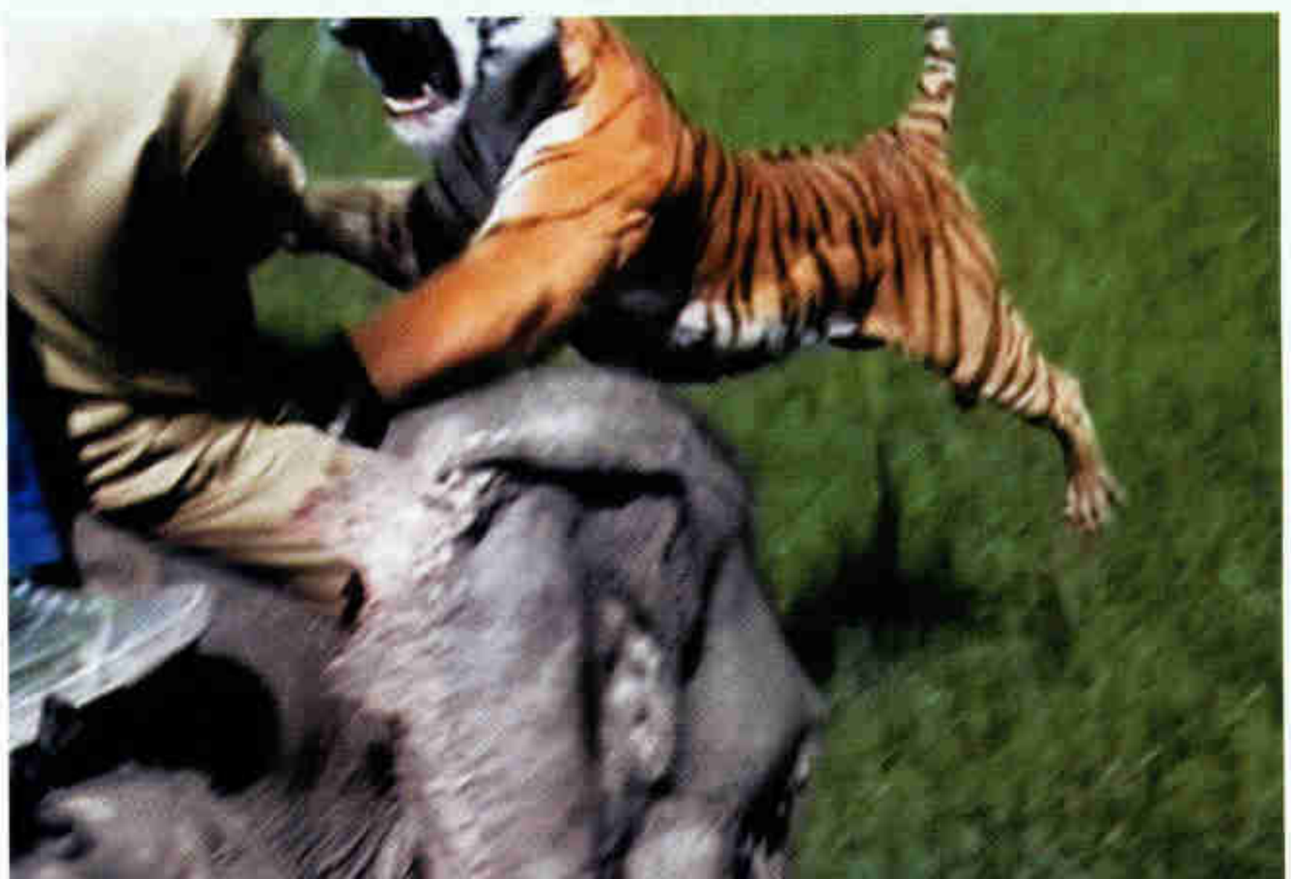
The tigress eluded capture and remains at large.

—Carol Kaufmann



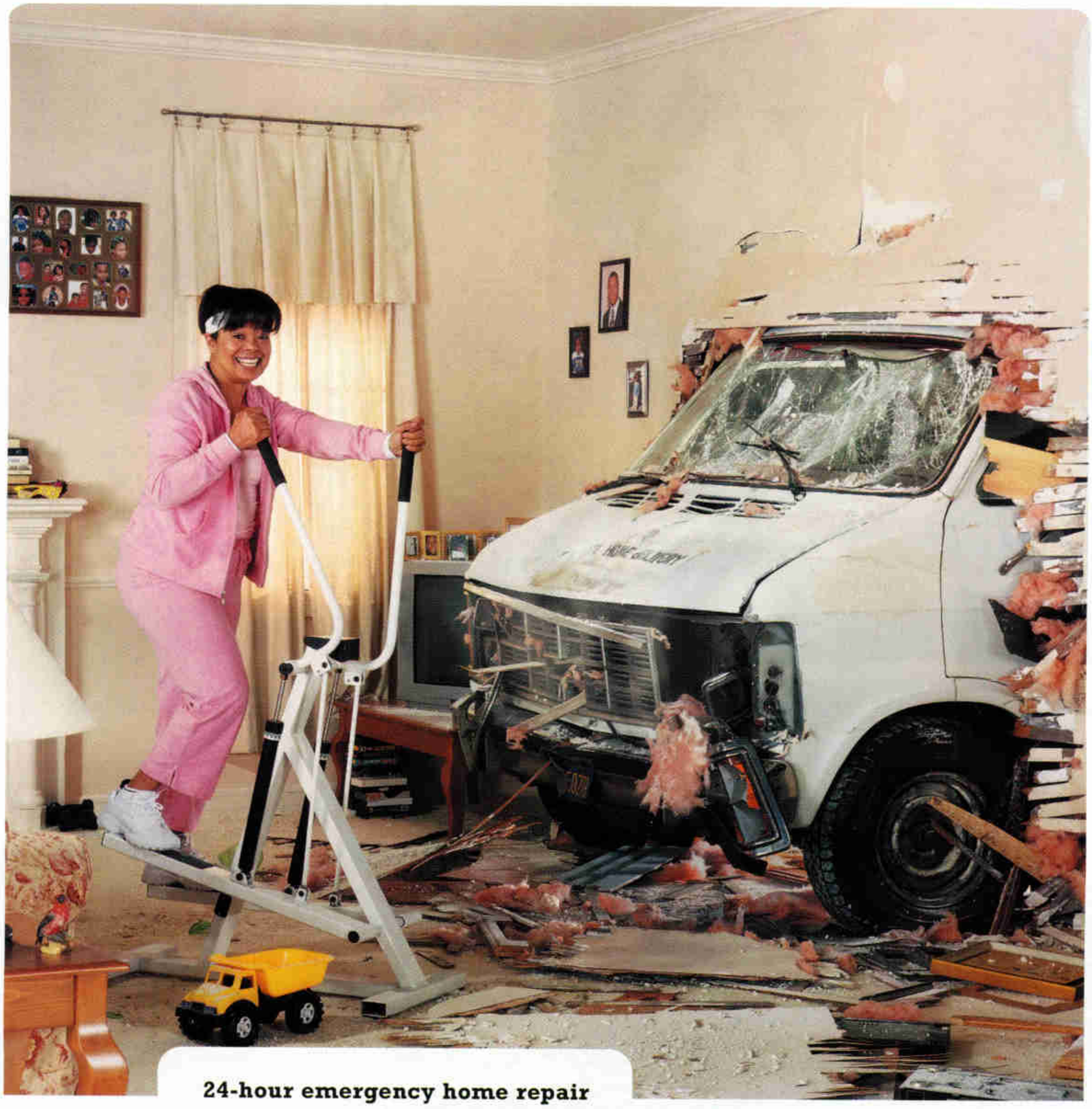






Target of a tigress's fury, an elephant handler in Assam, India, raises a bamboo stick as the cat launches in attack. Rangers were trying to relocate the animal after she killed several cattle in a nearby village.

RANJAN KUMAR DAS, *KAZIRANGA, LEAVES FROM A FORESTER'S NOTEBOOK*, SPECTRUM PUBLICATIONS, INDIA



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CULTURE

Last of the Panama Hat Makers

Keeping a centuries-old tradition alive in Ecuador

The weavers work in the cool of the tropical evening. They don't want sweat from their hands staining the toquilla palm-fiber "straw" used to make the Panama hats for which Ecuador's Montecristi region is famous. Beloved of royalty, movie stars, and mobsters, the hats have always been made in Ecuador, despite their name. Popularity with 19th-century gold-rush prospectors and others who purchased them in Panama likely gave them the misnomer.

Decades ago, it's said, 2,000 weavers lived in Montecristi; now there are less than 200. Of these, perhaps 15 have the skills to turn out the finest kind of Panama, the silky Montecristi *superfino.* Weaving's pay is low but its physical demands are high; artisans hunch for hours over wooden blocks around which hats are formed. Today many hat weavers are elderly; local youths can earn more by making cheap souvenirs.

In the past little profit from hat sales trickled back to Montecristi. But that's changing. Brent Black, a Hawaii-based hat dealer, started a nonprofit group to help weavers' villages. He plans to pay master weavers commissions based on what each Panama sells for—and his hat prices often top five thousand dollars. "I'm hoping more will stay with the art, or be drawn to it," Black says.

Perhaps his brightest prospect is 36-year-old Simón Espinal. Spinning neat, snug rows as fine as 50 to the inch, Espinal turns out only six or so hats a year. But his swift-moving hands could be the best chance to fan the embers of this fading craft. —*Roff Smith*

Weavers in Montecristi start each hat at the center of the crown (below) and work the long fibers in tight concentric circles outward to the brim (above).



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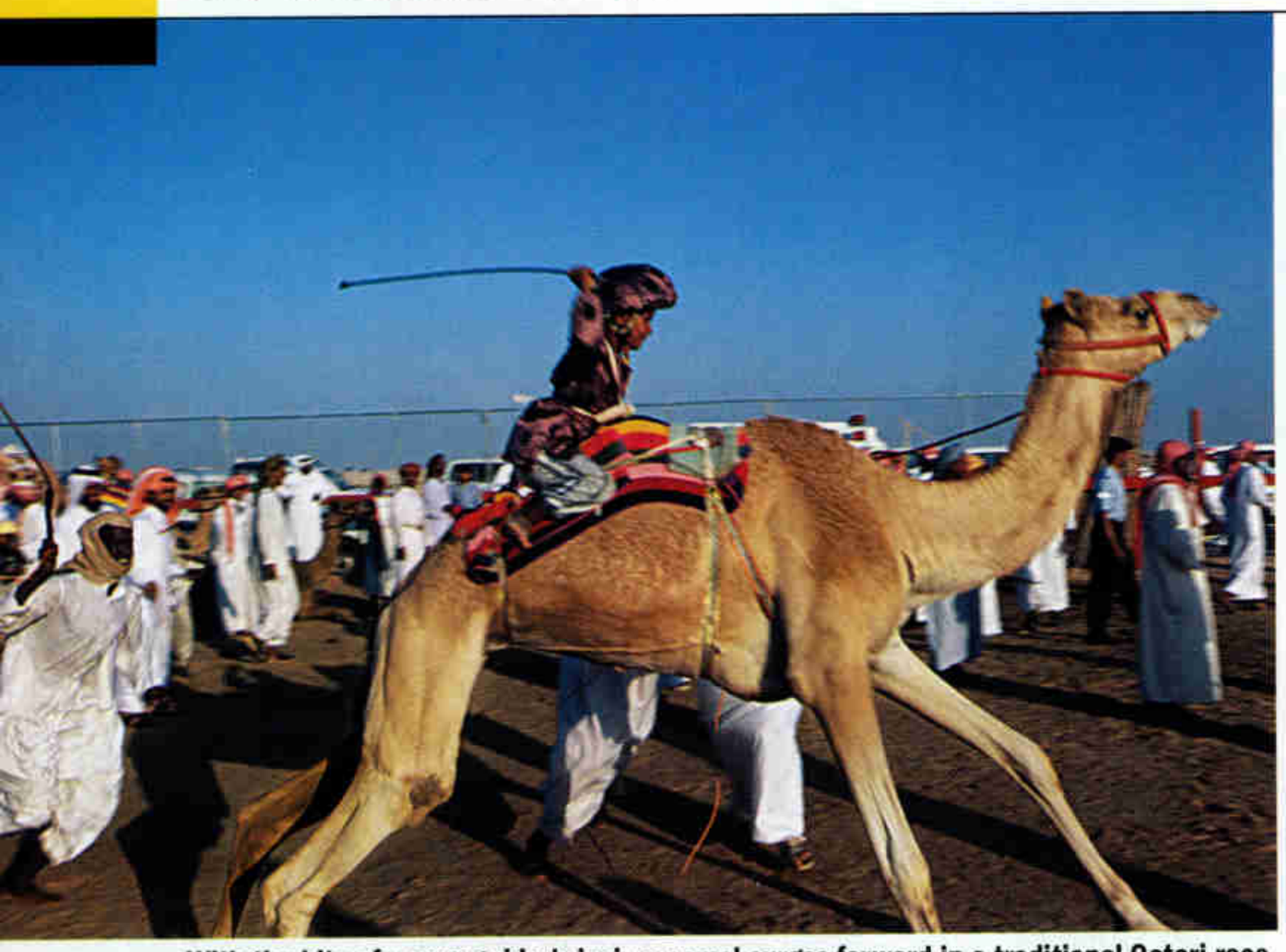
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With the bite of a young rider's lash, a camel surges forward in a traditional Qatari race. Robots like the Swiss-built Kamel (below) could soon replace human jockeys.

TECHNOLOGY

Robot Camel Jockeys

Qatar's android athletes ride in place of children

They are synthetic saviors, machines designed to replace underfed, undereducated boys in a potentially deadly sport. Qatar's cadre of robot camel jockeys raced for the first time in July. If they catch on, the robots could curb demand for the child jockeys who traditionally ride in the dust-choked contests.

Camel racing is popular in Persian Gulf states, but human rights activists say it fuels a brutal black market in children. According to the UN and other groups, thousands of boys as young as four years old work the race circuit.

Traffickers find many boys in poor regions of South Asia and Africa, where they are bought, abducted, or deceived into leaving home. Falls from camelback and tramplings injure and sometimes kill the boys. Abuse and neglect are common.

To combat the problem and preserve the sport, the Qatari government hired the Swiss firm K-Team to build new jockeys. Weighing in at about 35 pounds, the remote-controlled robots swing a lash and tug the reigns much as human riders do.

With neighboring nations watching Qatar's high-tech example, humanitarian groups hope the market for child jockeys will crumble. *—Neil Shea*



LAST CALL

Blue Dragons

A 5-foot-long, 25-pound iguana would seem to have the world by the tail. But on Grand Cayman Island in the Caribbean, the world's only wild blue iguana population has dwindled to precarious levels. As the island's human population has quadrupled since 1970, iguana habitat has shrunk. More roads mean more roadkill, and more pets are killing young iguanas. Conservationists are counting on a captive-breeding program to save the species. Since 2001, when only 25 iguanas wandered the island, naturalists for the National Trust for the Cayman Islands have introduced about 70 iguanas into two reserves. Now they're running out of room. "We need to buy 500 acres of private land, fence it, and remove the feral cats," says Fred Burton, program director. *—John L. Eliot*

An open-mouthed display may scare off some natural enemies, but Grand Cayman's blue iguanas have not been able to deter human threats.



CLOCKWISE FROM TOP: ROBB KENDRICK; ROYALTY FREE, CORBIS; M. SALEM, AFP/GETTY IMAGES



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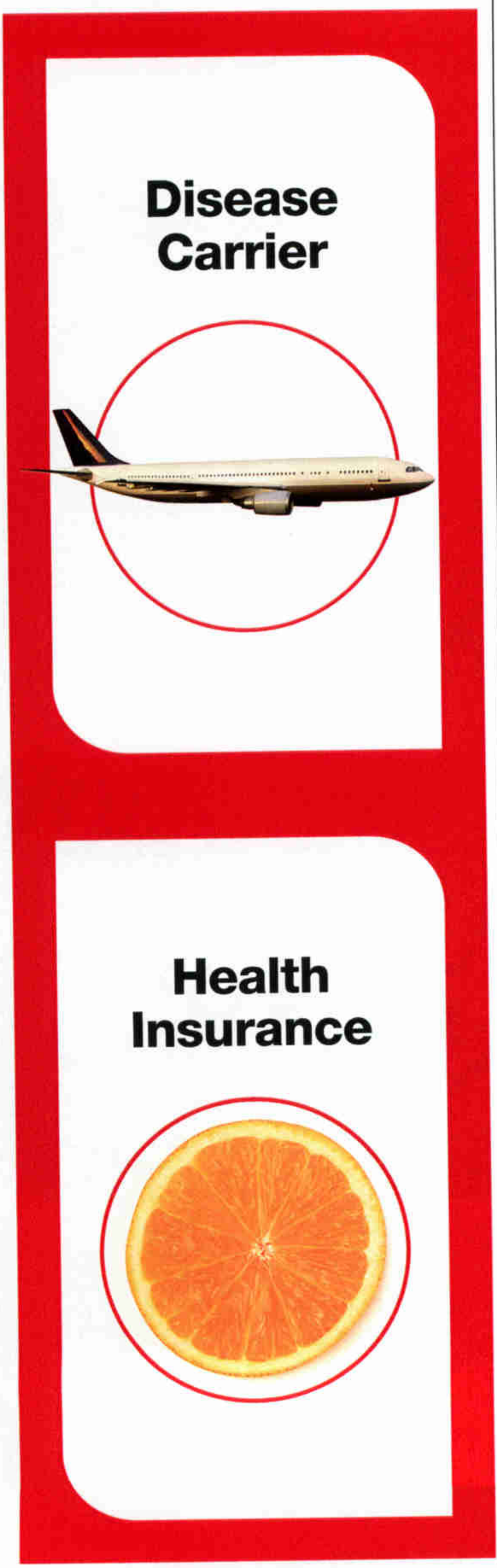
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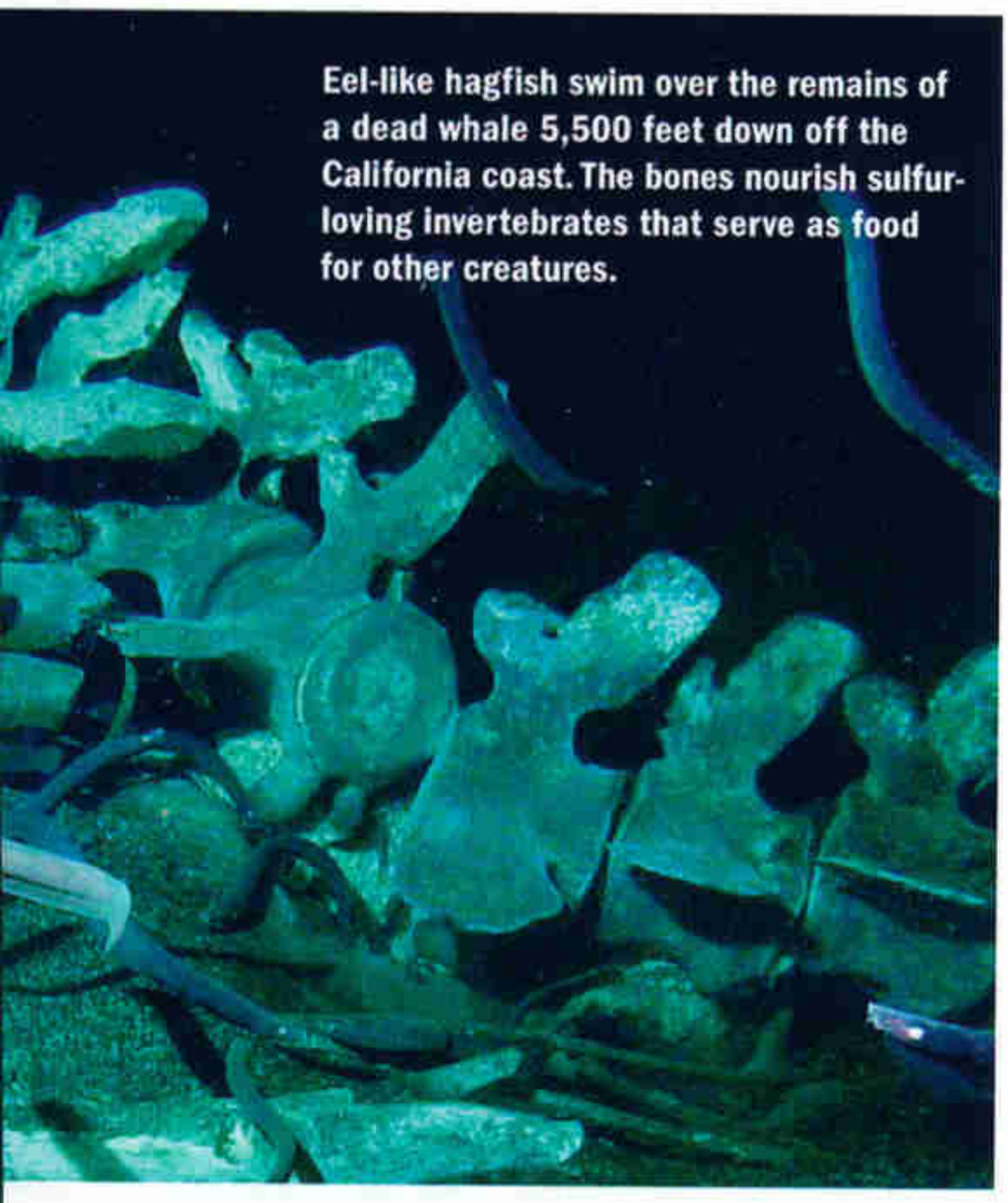
Dead Whale Watching

Underwater carcasses are crawling with afterlife

It's a tailor-made horror flick starring rotting corpses devoured by microbes, hagfish, and zombie worms. And it's playing at the bottom of the sea.

Dead whales on the floors of the world's oceans are "a food bonanza for diverse animal communities," says biological oceanographer Craig Smith of the University of Hawaii. "They're quite complex little ecosystems."

Called whale fall, each sunken carcass may host 40,000 individuals representing 200 animal species—from scavenging sleeper sharks to clams to worms that harbor marrow-digesting bacteria. So far scientists have found 32 species that seem to depend on a single corpse to complete their life cycles; Smith suspects that more than a hundred more such whale-fall



Eel-like hagfish swim over the remains of a dead whale 5,500 feet down off the California coast. The bones nourish sulfur-loving invertebrates that serve as food for other creatures.

specialists exist at various depths.

"A whale carcass is full of niches for filter feeders, for animals that rely on carcass lipids, sulfides, and bacteria, and for their predators," he says. On the seafloor, bones can endure for a century as a fat-rich food source.

Whale falls are abundant enough that colonizing animals can routinely find them. But scientists can't, so they tow dead beached whales out to sea and sink them for study. One finding from whale fall: a cold-water bacterial enzyme that may lead to energy-saving detergents. But just as valuable, says Smith, is the conservation message: "Whaling threatens deep-sea communities we never dreamed were there."

—Jennifer S. Holland

Hard to Swallow

Another delectable treat for bottom dwellers? Mucus. Spun as food traps by invertebrates called giant larvaceans, webs of mucus up to three feet in diameter catch floating food particles. Once discarded by the larvaceans, the webs sink and join whale fall as a seafloor food source.

CRAIG SMITH AND MIKE DEGRUY

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IN VRINDAVAN ALEX CHADWICK SPOKE WITH KRISHNA DEVOTEES RADHA MOHAN DAS (CENTER) AND BHAKTI NANDAN SWAMI.

Vrindavan is the first sacred place to be featured in the new NPR–National Geographic *Radio Expeditions* series *Geography of Heaven.* The series begins October 31 on NPR's *Morning Edition.*

Check npr.org for your local station.

Vrindavan, India

For Krishna devotees, it's heaven on Earth

BY ALEX CHADWICK

I got to heaven on a too-warm afternoon in November, a road-weary nonbeliever, undeserving and underwhelmed. No pearly gates here, no angel trumpets. Instead, pigs mucked belly-deep in open ditches along streets unpaved with gold, or even asphalt. The air was perfumed by piles of refuse burning in weedy, trash-blown lots. This place several dusty hours south of New Delhi was an unlikely paradise on first impression, but who knows what to expect of heaven?

Over the centuries just the idea of the afterlife has held power enough to raise pyramids, temples, cathedrals, and mosques in almost every place on Earth. It still holds that power for many, even though their faiths vary widely. But most seekers, no matter their particular belief, share this fundamental idea—that heaven exists in an otherworldly realm. Most seekers, that is, but not devotees of the Hindu god Krishna. For them heaven can be glimpsed here in Vrindavan, because this is where Krishna brought it down to Earth long ago.

In the vast Hindu pantheon of gods, Krishna is the all-attractive one, the focus of near-ecstatic devotion. He's said to have appeared in human form only for a single lifetime and spent his earthly boyhood as a cowherd in the low hills and forests that are now Vrindavan. Here he flirted



The spirit of Krishna, the Hindu god associated with bliss, seizes celebrants who chant, drum, and douse each other with colored powder during the March festival of Holi in Vrindavan. Believers flock here year-round to worship the sacred ground of Krishna's youth.

SHAWN LAKSMI PHOTOGRAPHY (BOTH)

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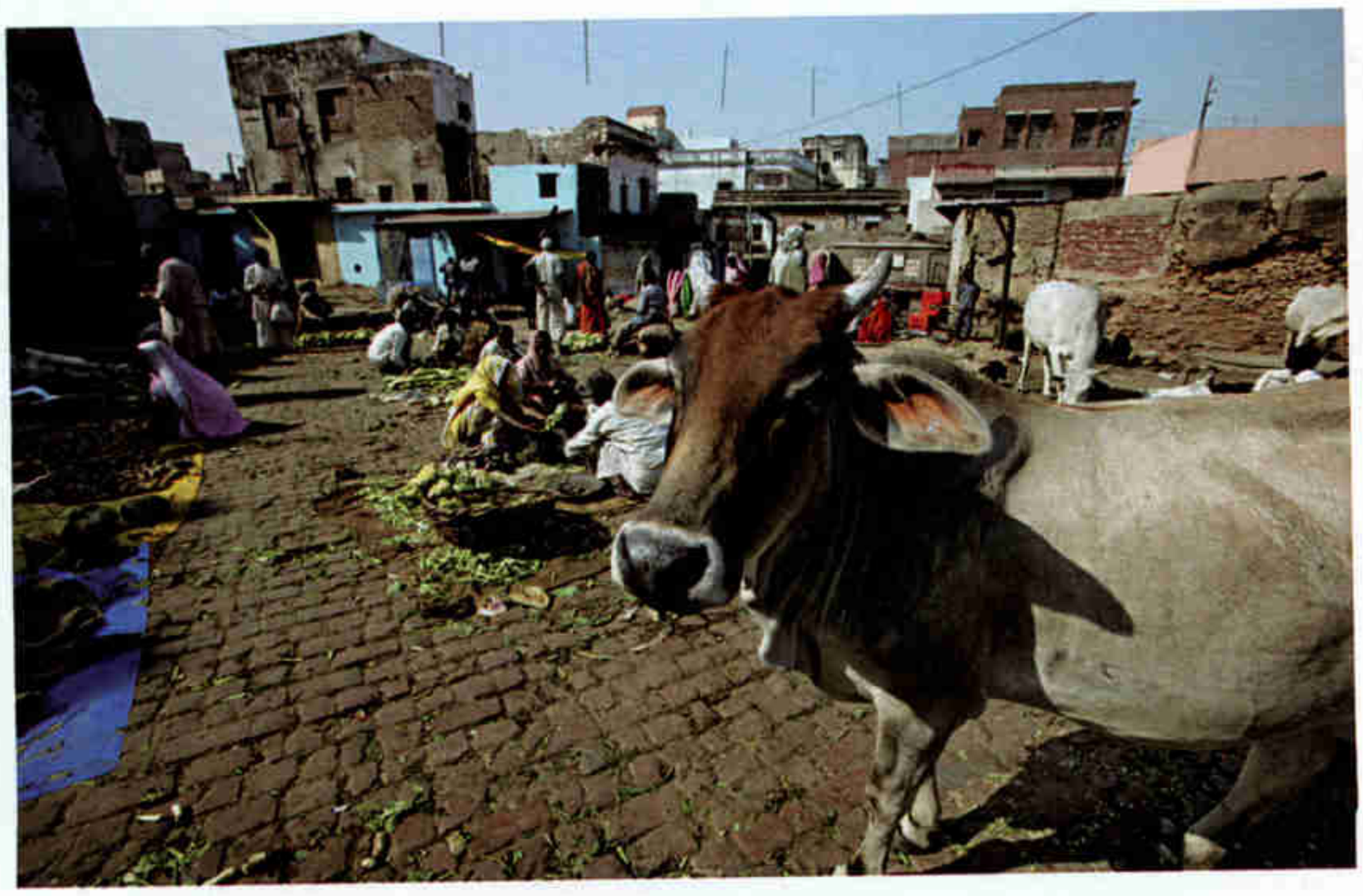
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"Krishna is playful, joyous, blissful, happy, and Krishna consciousness just means focusing on Krishna. He embodies the essence of the spiritual tradition that we call Hinduism." —RANCHOR PRIME, BRITISH PILGRIM TO VRINDAVAN



In a city of countless shrines, temples, and pilgrims, a Hindu holy man, or sadhu, finds peace inside the Radha Damodara Temple (above). Beginning in the 16th century, rulers, generals, merchants, and priests built temples in Vrindavan; some are still tended by descendants of the original priests. Before reaching the sacred precincts, pilgrims encounter littered streets and wandering cows and pigs (left). Vrindavan's growing population and popularity are creating more mess and unquiet in the holy city.

SHAWN LAKSMI PHOTOGRAPHY (TOP); ALEX CHADWICK (BOTTOM)

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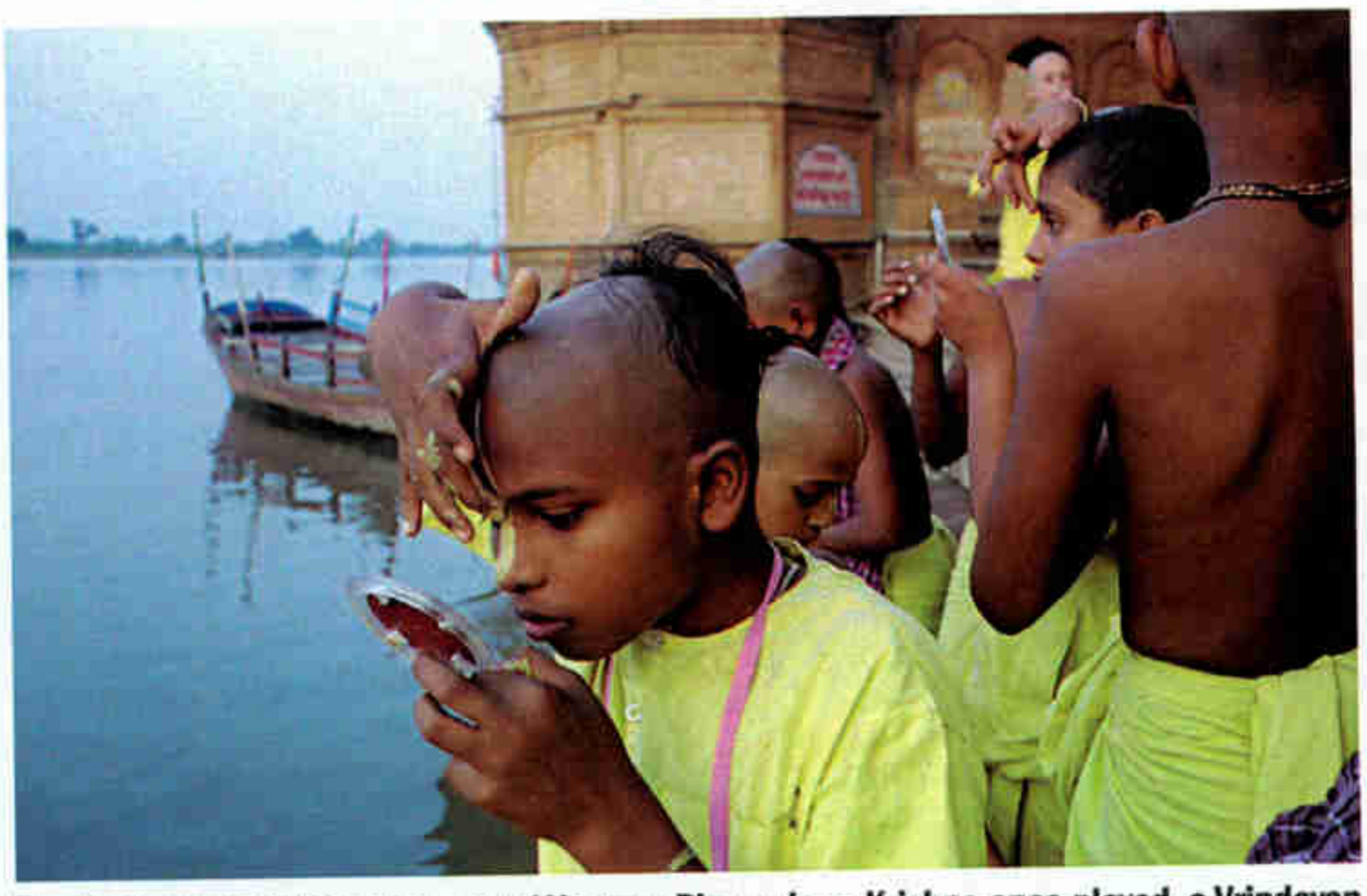
with the *gopis*, the milkmaids who tended cows along the banks of the Yamuna River. He ate fruit from the forest trees, played his flute, and, as he grew to manhood, consorted with his love, the gopi Radha. In later life Krishna became the great god-sage of the Hindu holy book the *Bhagavad Gita*. But in Vrindavan his followers worship the young Krishna, the giver of bliss to all creatures around him.

While Krishna never lost his place in the Hindu mind, Vrindavan did fall into oblivion. Then in the 16th century A.D. a Krishna devotee named Chaitanya began a movement to make the sites associated with Krishna's life sacred places of worship. Inspired by Chaitanya, maharajas began building temples here along the Yamuna to the glory of Krishna and Radha. While they were at it, they often added small palaces for themselves. Today, past the veneer of eyesores that ring Vrindavan, these aging domed masterpieces crowd into the curving embrace of the Yamuna.

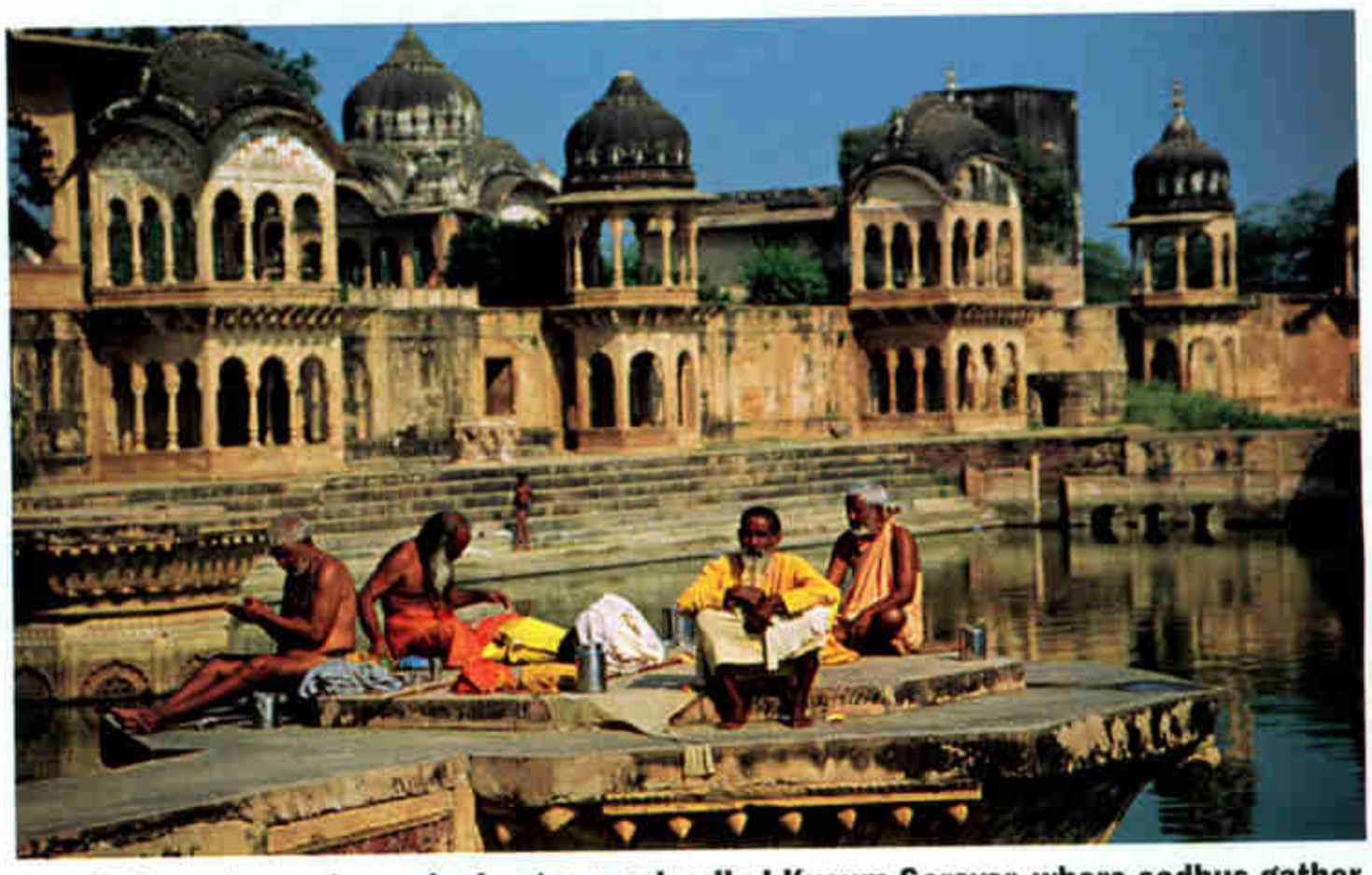
Evenings, the distant sound of chanting, drumming, the warble of a sitar can be heard beyond the ratty sputter of diesels and motorbikes. One night I took a pedicab through town to the Radha Raman, a temple to Radha I had heard about. Even in the dark the air was still feverish both with heat and the ardor of nightly worship. When I arrived, people were hurrying through an archway into the temple courtyard. Water splashed from a pipe jutting from the courtyard wall. Leaving their sandals behind, the devotees washed their feet and entered the temple. I did the same.



Outside a temple a street vendor sells devotional offerings—marigolds and other flowers, incense, and lamps filled with ghee—for pilgrims to place on an altar to Krishna.

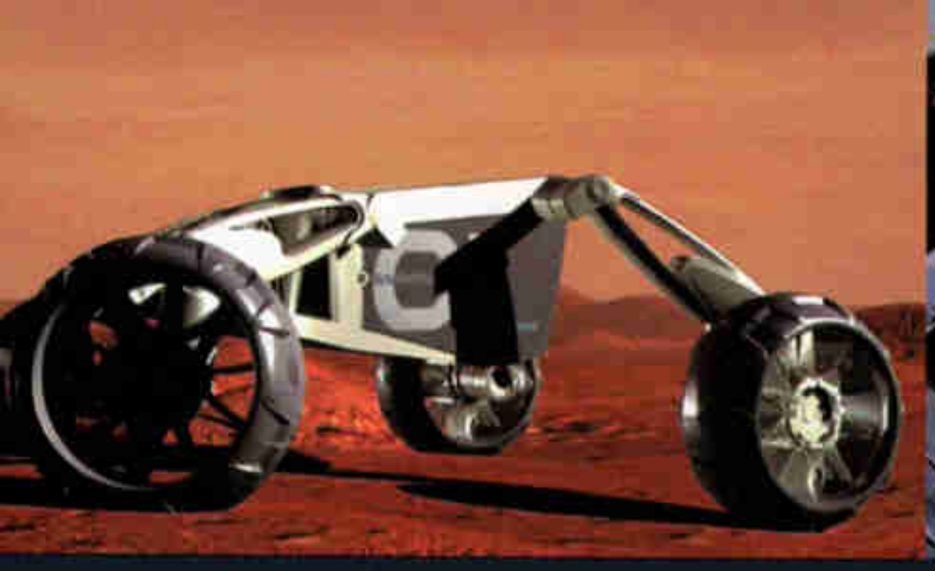


To signify his bathing in the sacred Yamuna River, where Krishna once played, a Vrindavan boy from a local Hindu school applies a *tilak*, or mark of devotion, on his forehead.



Simplicity and grandeur mingle at a pond called Kusum Sarovar, where sadhus gather before an 18th-century temple. Legend says that Krishna met his lover Radha here.

SHAWN LAKSMI PHOTOGRAPHY (ALL)





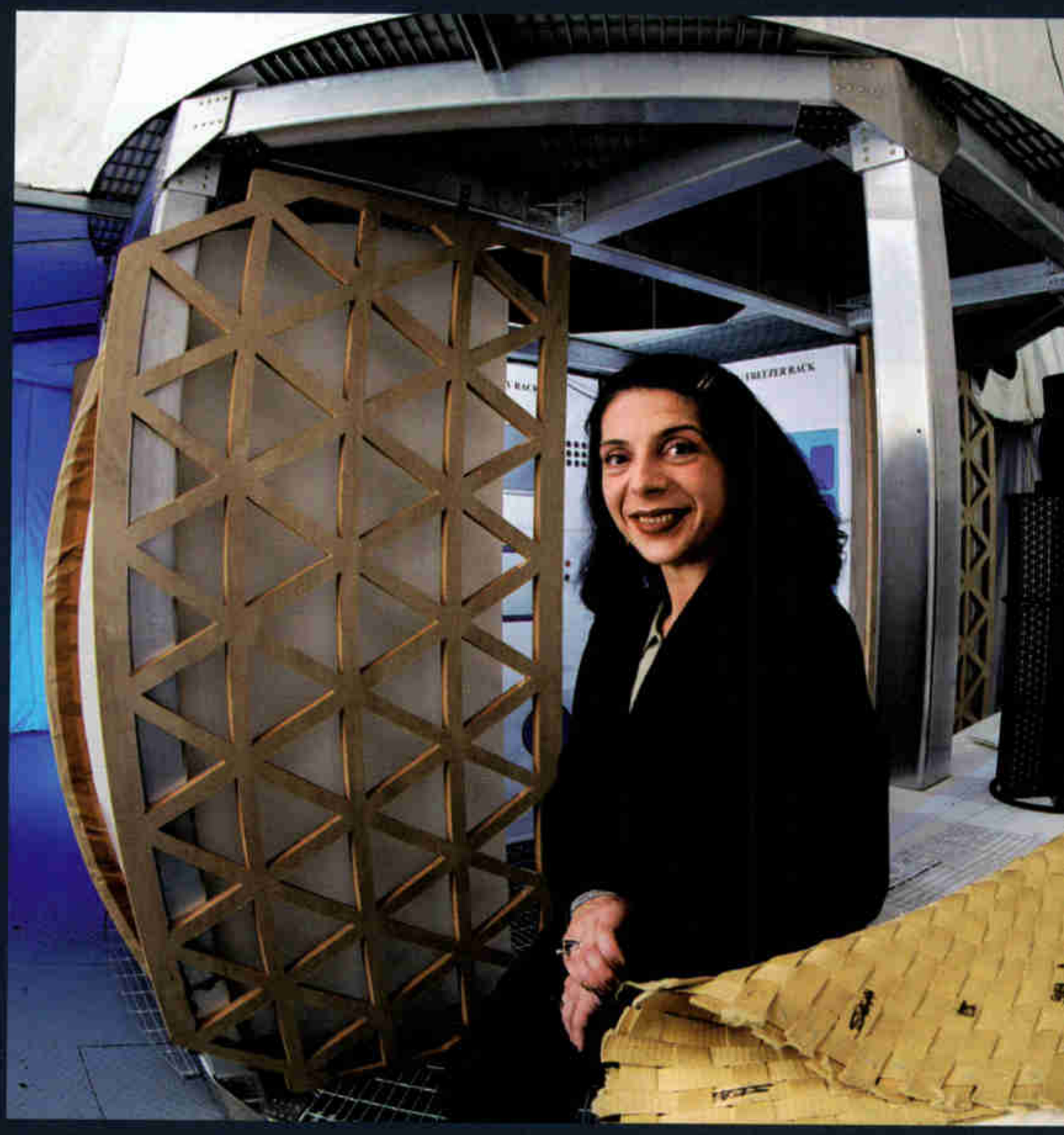


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—Constance Adams, Space Architect



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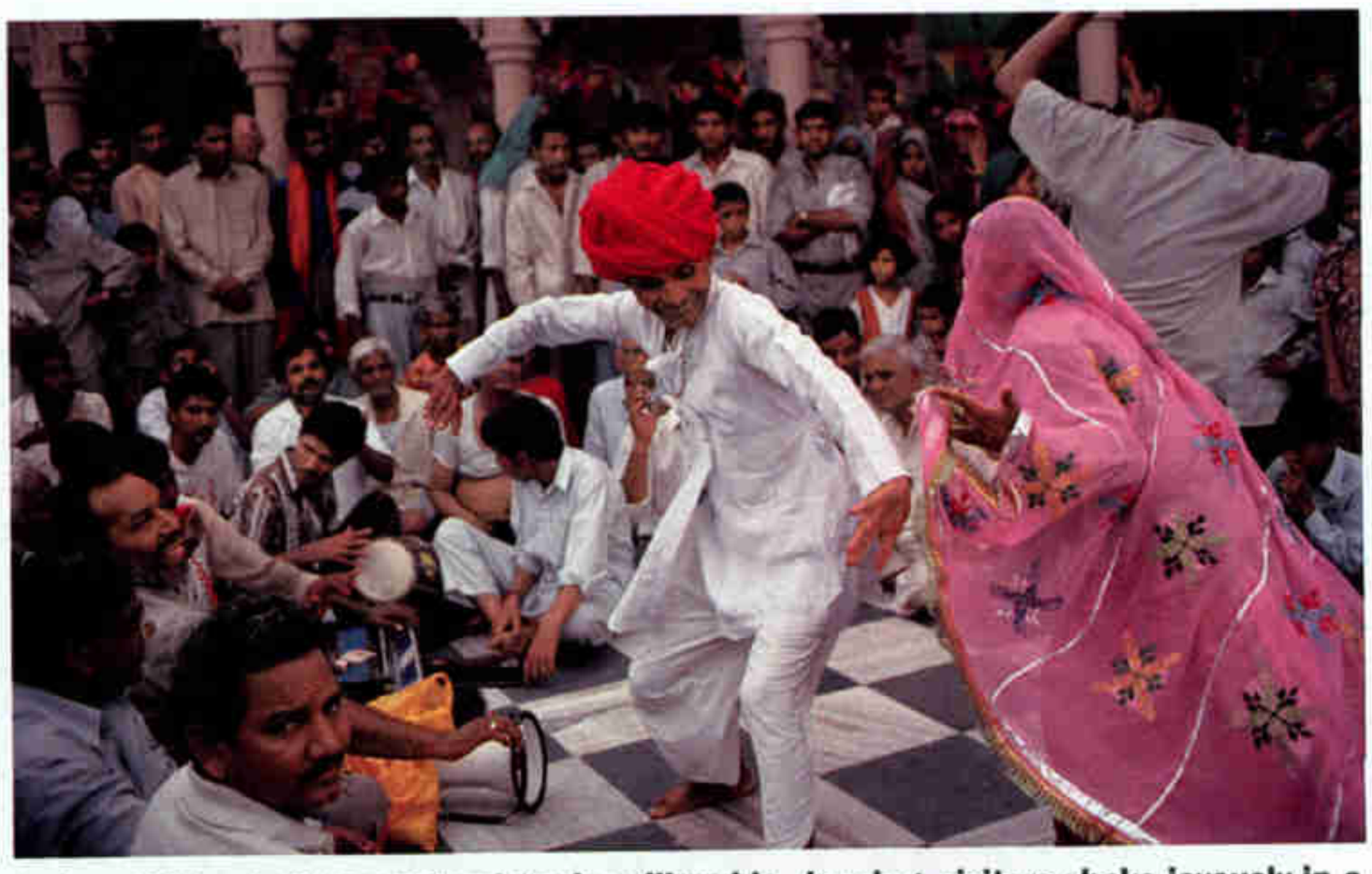


Inside, some 200 worshippers were sitting in the middle of the floor—a handful of Westerners sprinkled among the group. Other devotees circled the room, chanting quietly or walking silently. Radiant with a blissful expectation, everyone was watching a pair of golden doors on a dais behind stone arches. When bare-chested priests came out and slowly opened the doors, the moment was both less and more than I had expected.

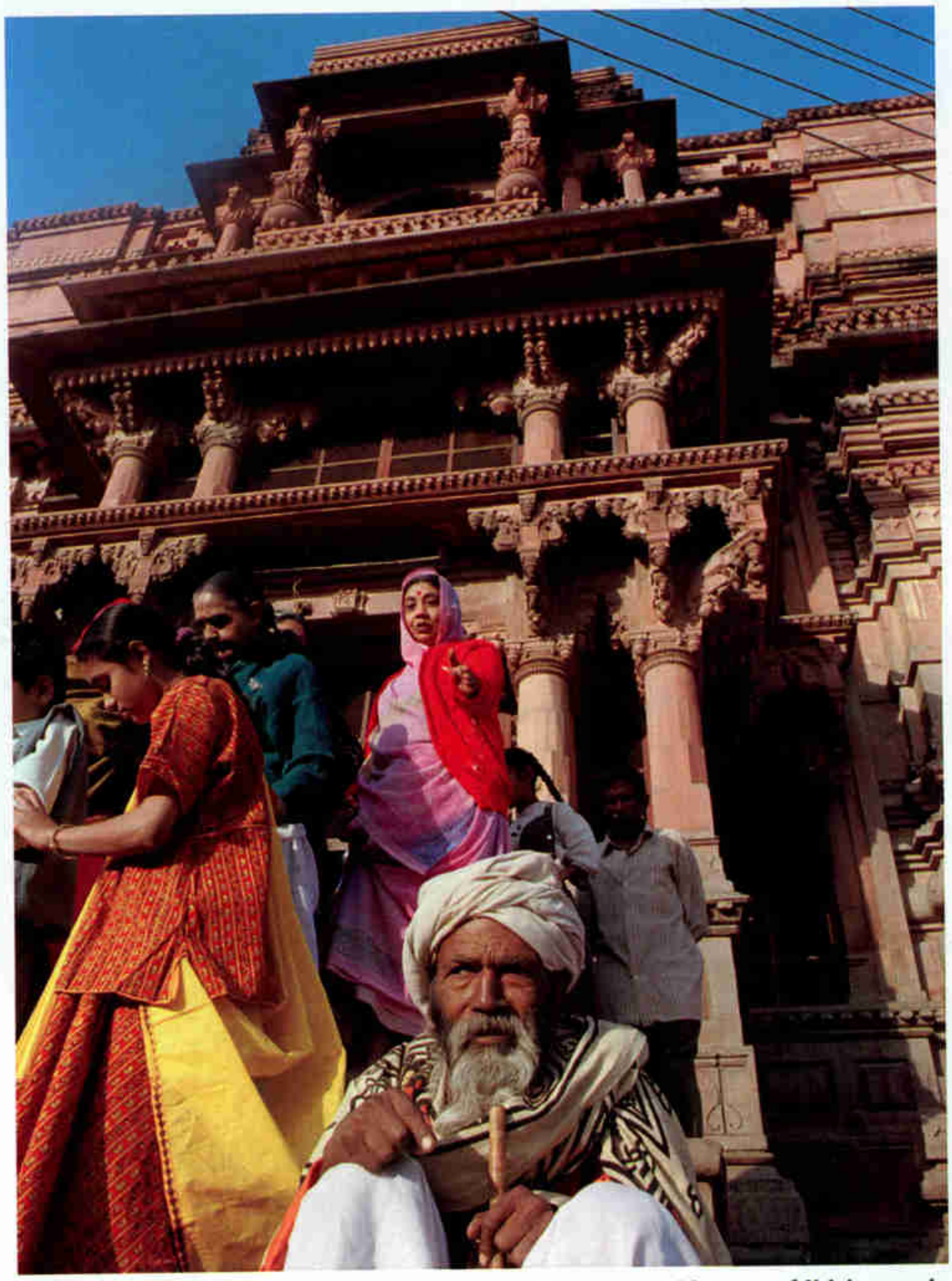
In the dim light I could barely see a carved figure of Krishna. No bigger than my hand, it rested on a modest throne supported by two silver cows. But the sight stirred the devotees deeply, as if they were actually looking into the face of God. Standing, pressing forward transfixed, their gasps and cries making a hushed roar, they saw Krishna clearly, even if I could not.

After a few minutes the priests closed the golden doors, and the energy in the air slowly drained away. The light was the same, as was the room. Nothing had changed, and everything had. As if dazed by a revelation, many of the devotees didn't seem to know where they were or how they got there.

I am less learned than a novice devotee, and far less certain of eternity. But even for the ardent believer, part of the allure of heaven must be its mystery. I'm going to try to explore more of these sacred corners of the planet, and Vrindavan has been a good place to start. Heaven or not, with its blessings and burdens Vrindavan radiates a tolerance and grace. The devotion I found here to achieving—and sharing—human happiness makes paradise seem possible. □



Just as Krishna's flute set local *gopis*, milkmaids, dancing, visitors shake joyously in a temple courtyard near Vrindavan, at the birthplace of Krishna's consort, Radha.



Many pilgrimages begin at Govind Dev Temple, where revered images of Krishna and Radha are kept. To follow in the lovers' steps is to enter the Hindu "highest heaven."

SHAWN LAKSMI PHOTOGRAPHY (BOTH)

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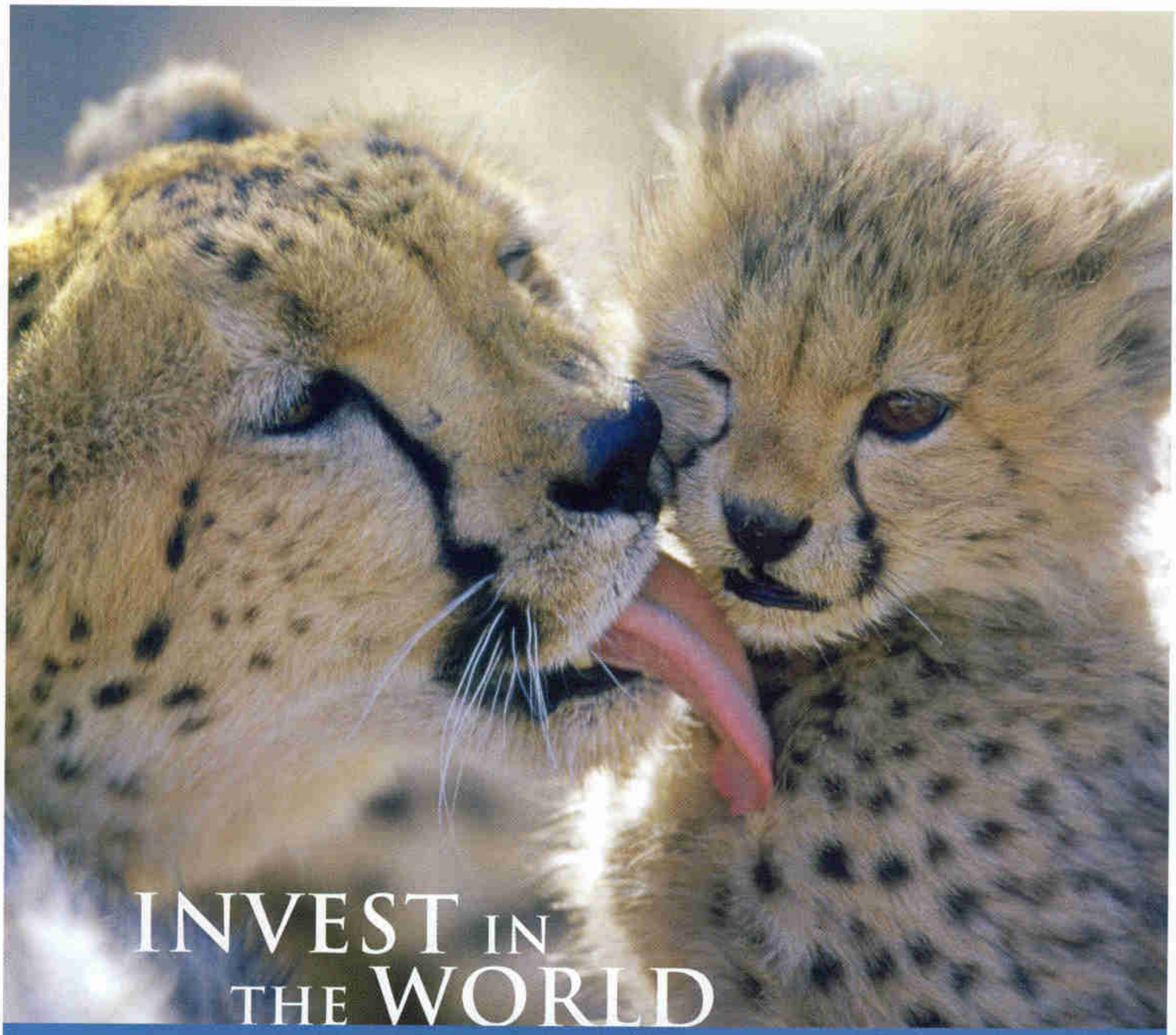
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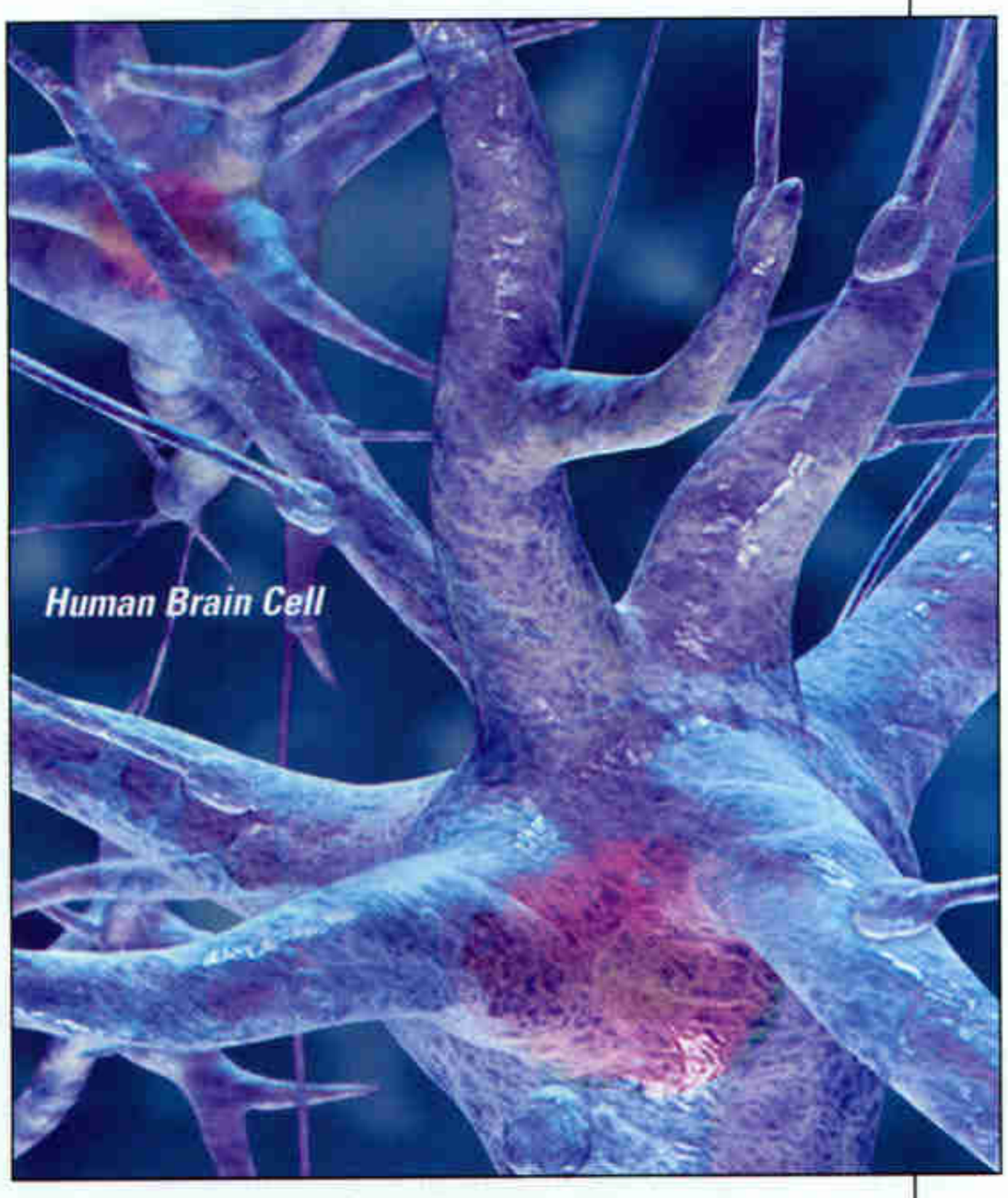
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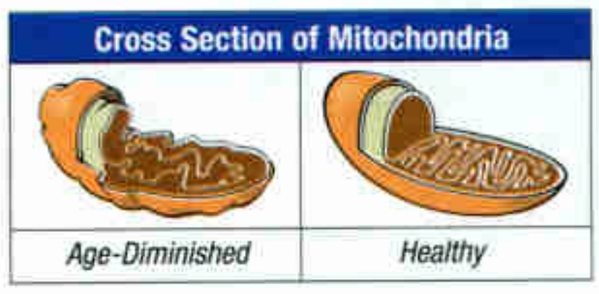
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SECRETS OF LONG LIFE

The Kiss of Health

New habits learned from a very old story

That women have been known to flirt with National Geographic photographers isn't exactly news. But at 107, Raffaella Monne of Sardinia, Italy, was one of a kind. "She teased that her husband, who died a few years ago, would be jealous of her kissing another man," says photographer **David McLain.**

Such vitality among the centenarians he met in Italy, Japan, and the United States had a big impact on David, a mere 36. "When traveling, I often learn about better ways of living that I'll plan to incorporate into my life. Then I get home and slip into familiar habits—but not this time," David says. He's eating more tofu and trying to stick to a plant-based diet. "And I'm more aware of how faith and family can affect my health." As for how this photo will affect his marriage: David's wife, Anne, laughs and says, "Actually, I think it's incredibly sweet."



Never too old to make a new friend, Raffaella Monne, 107, welcomes photographer David McLain to her home in Sardinia, Italy. Still active, Raffaella injured her arm a few years ago when she fell out of a tree while picking nuts.

GIANLUCA COLLA

GNMENT

COVERING THE WORLD



CONTRIBUTORS



Writer Calvin Trillin and other fast-fingered diners dig in at a Louisiana crawfish feast.

MAURICE, LOUISIANA

A staff writer at the *New Yorker* for more than 40 years, **Calvin Trillin** is no stranger to Cajun country. "I've spent a lot of time in that part of Louisiana," he says. "I've done stories on attempts to revive French among the Cajuns and on Cajun boudin, and I've done a murder story or two."

Reporting once on a crawfish-eating contest in Breaux Bridge, Louisiana, Calvin heard that the event's perennial winner, a septuagenarian, had been advised by doctors to stop competing. "He'd spent a lifetime enjoying the best foods Louisiana has to offer, so he wasn't sorry," notes Calvin. "He said, 'There have been kings who haven't eaten as well as I did.' I know just how he felt."

WAR LETTERS

Author **Andrew Carroll** circled the globe twice collecting war letters, and in some places fighting still raged. He was leaving Baghdad on a military flight when a missile hit the plane taking off ahead of his. Andrew asked a soldier at the airport if his plane would still depart. "Of course," the soldier responded. "And don't worry, when you take off you're full of fuel, so if anything happens, it'll be over quick."

Other legs of his journey were more relaxing, particularly the Egypt Air flight from Cairo to Kuwait City. When Andrew asked if he could have an aisle seat, the ticket agent said, "Sir, you can sit anywhere you want." Turns out Andrew was the flight's only passenger. "That really is the best way to fly," he says.

NEPAL'S REVOLUTION

"I'd never worked in a situation like this before," says photographer **Jonas Bendiksen** of his time in the Maoist-held territories of Nepal. "The areas where the guerrillas operate have virtually no electricity, no roads, no telephones." Planning was difficult. "There was no jeep to jump into, no way to call ahead. If I wanted to know what was happening on the other side of the ridge, I had to walk two days to get there. And these are the foothills of the Himalaya. It was challenging."

Jonas came away skeptical of the rebels' cause but awed by their logistical ability. "These guys communicate by passing written notes over the mountains, and still they were able to organize a mass meeting of 10,000 people," he says. "People came from all directions, from villages days away, and everyone arrived at almost the exact same time."

OCELOTS

Photographer **Christian Ziegler** relied on the newest photographic technology in his pursuit of the elusive nocturnal ocelot. Too bad new doesn't always equal fast and convenient. Day after day Christian and his assistant, Robert Horan, lugged 150 pounds of equipment and sat out all night in a pitch-black jungle wearing night-vision goggles so they could tend their remote-control cameras. "We worked three months before we got images worthy of printing," Christian says. Their reward: groundbreaking pictures like the one on pages 76-7, shot using infrared light.



Photographer Christian Ziegler takes an infrared view of the darkening Panamanian rain forest.

TALES FROM THE FIELD

Find more stories from our contributors, including their best, worst, and quirkiest experiences, in Features at **ngm.com/0511.**

BOB SACHA (TOP); ALEXANDER LANG



Key Deer *(Odocoileus virginianus clavium)*
Size: Shoulder height, 61-81 cm **Weight:** 29-57 kg **Habitat:** Restricted to Lower Keys at the extreme southern tip of Florida, especially National Key Deer Refuge at Big Pine Key
Surviving number: Estimated at 500

Photographed by Joel Sartore

WILDLIFE AS CANON SEES IT

When is a deer too dear? Florida's Key deer is certainly well loved—it's known as a "toy" deer by many who are charmed by its small size and adorable appearance. But by feeding the deer, well-meaning humans are blunting the instincts it needs to survive in the wild. Left to its own devices, it spends up to half the day foraging from a long menu of more than 160 plant species. Bucks and does come together mostly during mating season. Unable to reproduce quickly enough to offset losses due to human disturbance, the population was down to an estimated 26 by 1945. Habitat loss and fatal run-ins with cars threaten the hard-won gains that have been made since.

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NATURE
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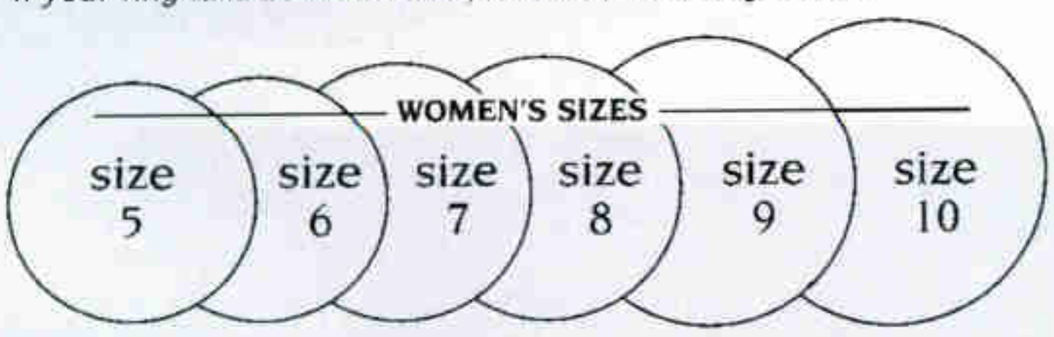
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Who Knew?

MICROBIOLOGY

Growing on You

Our bodies are crawling with microbes

Science is always trying to cut human beings down to size, either by reminding us of how small and ephemeral we are in the grand cosmic mind-jangling scheme of things, or by describing us as essentially no more than the life-support machinery for a gaggle of genes that have their own selfish needs. So here's yet another humbling thought: Most of our cells aren't even human.

If you had to count all the cells in your body, the vast majority—by a factor of ten—would be microbes. They're everywhere. They're on your eyeballs, in your mouth, nose, and ears, and all over your skin. They include microscopic creatures that, magnified, look like horror-movie monsters. These nonhuman organisms are particularly abundant in your guts. There are up to a hundred trillion microorganisms in the human intestine.

"We're really a composite of species. We have human cells, but there are ten times more microbial cells," says Jeffrey Gordon, who researches intestinal microbial communities at Washington University in St. Louis.

It raises an interesting question, Gordon says, about what it means to be "human." Certainly the water molecules in our bodies are not, in and of themselves, human. You might argue that our DNA is human, but that gets into another humbling area, as we have many of the same genes as other animals. Factoring in the microbes, we see that most of the genetic information carried in and around our bodies is nonhuman.

Strangely enough, we don't know the identities of most of these microbes. We haven't figured out how to culture them. Instead, scientists "grow" snippets of DNA, and have come to the conclusion that each one of us hosts somewhere between 500 and 1,000 species of microbes, representing about 8,000 subspecies. Stanford University microbiologist David Relman says this internal multitude varies so distinctly from person to person that it can serve as a kind of fingerprint of an individual. (Or, as he and other scientists said in a recent paper, "We discovered significant intersubject variability and differences between stool and mucosa community composition.")

What's clear is that the microbes are not a bunch of invaders. Rather, we co-evolved. A human body is like a complex ecosystem—a biosphere, almost. Different species follow their own agendas, but collectively they advance the cause of the whole. Gut microbes perform some indispensable functions: They help us digest food, produce vitamins, and ward off disease. This is, as Gordon puts it, a "strategic alliance," a symbiosis between mammals and microbes that goes back millions of years.

"So can we optimize the performance of our microbial society—learn from the microbes?" wonders Gordon.

What if we discovered that our entire evolution is essentially a side effect of the requirements of the microbes in our guts? Maybe those organisms needed to modify their hosts to be more efficient at finding certain kinds of food for them. If so, it's about time we turned the tables. From now on, by gosh, they work for us.

—Joel Achenbach

WASHINGTON POST STAFF WRITER



PHOTO ILLUSTRATION BY
CARY WOLINSKY AND JEN CHRISTIANSEN

BY DAN BUETTNER PHOTOGRAPHS BY DAVID McLAIN

The Secrets of Long Life

OKINAWA, JAPAN

Squatting effortlessly on a slippery embankment, 89-year-old Kame Ogido inspects a pinch of seaweed, part of a low-calorie, plant-based diet that may help give Okinawans an average life expectancy of 82 years, among the longest in the world. These seniors, and others in Italy and California, show how to live longer, healthier lives.





SARDINIA, ITALY

From first light to twilight, 75-year-old shepherd Tonino Tola never stops walking, chopping, trimming, roping, repairing... living. Keeping active—and sharing the work and worries of daily life with a spouse—may be a key factor in the lifestyle of Sardinians who enjoy extraordinary longevity.

LOMA LINDA, CALIFORNIA

Last year, when she turned 100, Marge Jetton renewed her driver's license for another five years. But what truly keeps her going, she says, is her Christian faith. She and other Seventh-day Adventists—who avoid junk food and caffeine—tend to live four to ten years longer than the average Californian. "We need someone to guide us in this life, and we need great hope," she says. "God is a good friend to have."

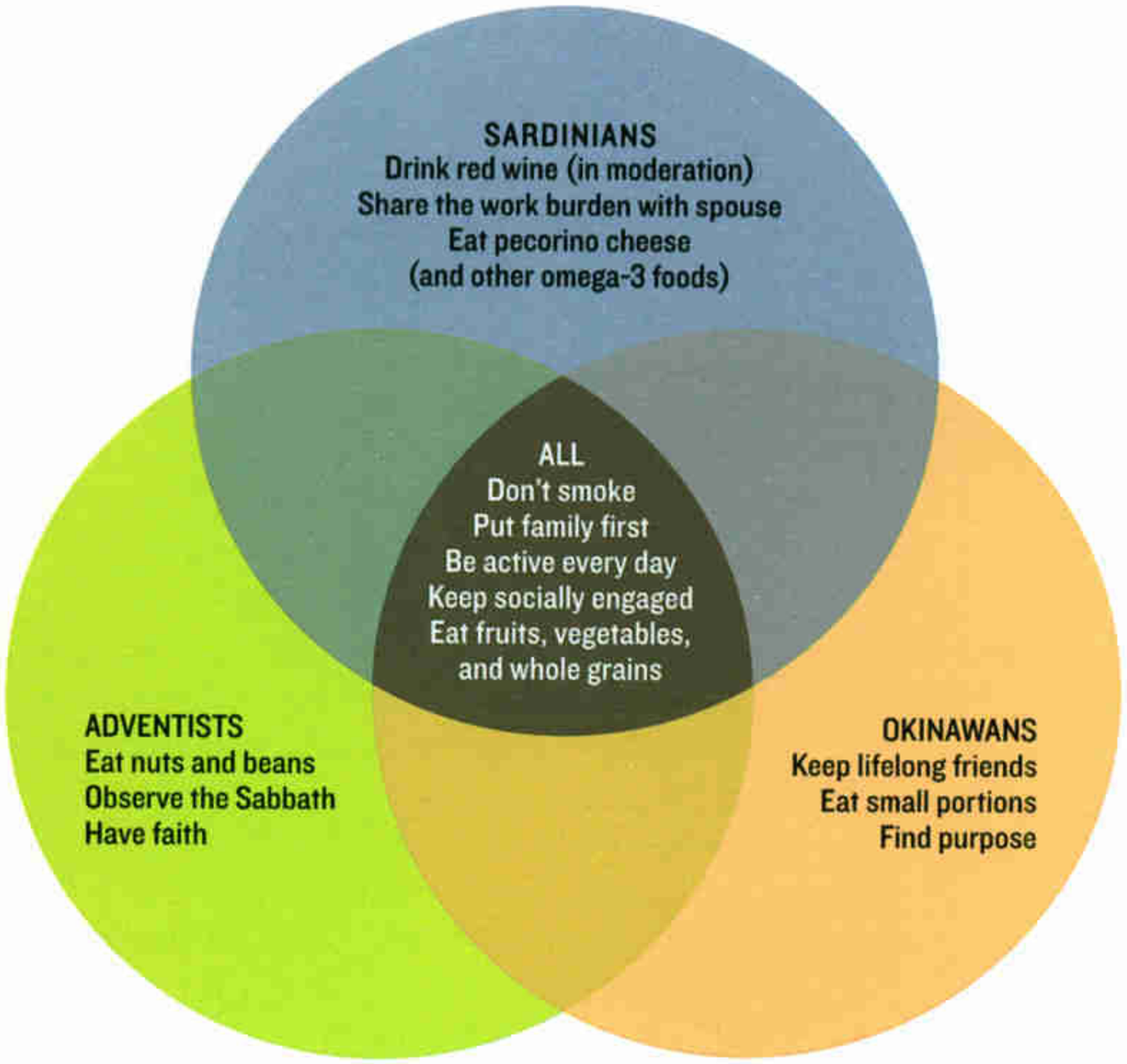

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WHO YOU CALLING OLD?

When Frank Shearer first put on water skis in 1939, they were wooden planks with rubber straps screwed on top. Now he's 100 years old, far better equipped, and still kicking up the spray near his home in Washington State. "I like the outdoors and the exercise," he says. "And with waterskiing, there's always an extra little charge."

What if I said you could add up to ten years to your life?

A long healthy life is no accident. It begins with good genes, but it also depends on good habits. If you adopt the right lifestyle, experts say, chances are you may live up to a decade longer. So what's the formula for success? In recent years researchers have fanned out across the globe to find the secrets to long life. Funded in part by the U.S. National Institute on Aging, scientists have focused on several regions where people live significantly longer. In **Sardinia, Italy,** one team of demographers found a hot spot of longevity in mountain villages where men reach age 100 at an amazing rate. On the islands of **Okinawa, Japan,** another team examined a group that is among the longest lived on Earth. And in **Loma Linda, California,** researchers studied a group of Seventh-day Adventists who rank among America's longevity all-stars. Residents of these three places produce a high rate of centenarians, suffer a fraction of the diseases that commonly kill people in other parts of the developed world, and enjoy more healthy years of life. In sum, they offer three sets of "best practices" to emulate. The rest is up to you.



HOW THEY LIVE LONGER

Super seniors in three widely separated regions share a number of key habits, despite many differences in backgrounds and beliefs.

- In the U.S. the ratio of female to male centenarians is about four to one. In parts of Sardinia it's more like one to one.

Sardinians



Honor Family

Nursing homes, senior centers, assisted-living communities—that's a foreign language to 103-year-old Giovanni Sannai (in dark cap at head of table), who regularly dines with his very extended family. Gerontologists say seniors who live near loved ones tend to live longer. Sannai is a bit skeptical. "Nobody knows why people like me live so long, and neither do I."

Out in the work shed behind his house in the village of Silanus, 75-year-old Tonino Tola emerges elbow-deep from the steaming carcass of a freshly slaughtered calf, sets down his knife, and greets me with a warm, bloody handshake. Then he takes his thick glistening fingers and tickles the chin of his five-month-old grandson, Filippo, who regards the scene from his mother's arms. "Goochi, goochi goo," Tonino whispers. For this strapping, six-foot-tall shepherd, these two things—hard work and family—form the bedrock of his life. They may also help explain why Tonino and his neighbors are a hot spot of longevity.

A community of 2,400 people, Silanus is located on the sloping fringes of the Gennargentu Mountains in central Sardinia, where parched pastures erupt into granite peaks. In a cluster of villages in the heart of a region called the Blue Zone by demographers, 91 of the 17,865 people born between 1880 and 1900 have lived to their hundredth birthday—a rate more than twice as high as the average for Italy.

Why the extraordinary longevity here? Lifestyle is part of the answer. By 11 a.m. on this particular day, Tonino has already milked four cows, split half a cord of wood, slaughtered a calf, and walked four miles of pasture with his sheep. Now, taking the day's first break, he gathers his grown children, grandson, and visitors around the kitchen table. Giovanna, his wife, a robust woman with quick, intelligent eyes, unties a handkerchief containing a paper-thin flatbread called *carta da musica,* fills our tumblers with red wine, and slices a round of homemade pecorino cheese with the thumping severity of a woman in charge.

Like many wives here whose husbands are busy tending sheep, Giovanna shoulders the burdens of managing the house and family finances. Among Mediterranean cultures, Sardinian women have a reputation for taking on the stress of these responsibilities.





Drink Red Wine

Thin as a sheet of music, *carta da musica* flatbread is a traditional part of the Sardinian diet, which some studies say may reduce the risk of heart disease. Similar benefits are claimed for a daily glass of red wine, which contains a component that may prevent arterial clogging. No wonder a Sardinian greeting—*a kent'annos*, health and life for 100 years—doubles as a toast.



For the men, less stress may reduce the risk of cardiovascular disease, which may explain why the ratio of female to male centenarians is nearly one to one in some parts of Sardinia, compared with a four to one ratio favoring women in the United States.

"I do the work," admits Tonino, hooking Giovanna around the waist, "my *ragazza* does the worrying."

These Sardinians also benefit from their genetic history. About 11,000 years ago, hunter-gatherers from the Iberian Peninsula made their way eastward to Sardinia. After several millennia the Bronze Age Nuragic culture arose on the island's fertile coastal plains. When military powers such as the Phoenicians and Romans discovered Sardinia's charms, the natives were forced to retreat deeper and deeper into the highlands. There they developed a wariness of foreigners and a reputation for banditry, kidnapping, and settling vendettas with the *lesoria*, the traditional Sardinian shepherd's knife.

In their isolation native Sardinians became genetic incubators, amplifying certain traits over generations. Even today roughly 80 percent of them are directly related to the first Sardinians, says Paolo Francalacci of the University of Sassari. Somewhere in this genetic mix, he says, may lie a combination that favors longevity.

Tonino's family's diet is another factor. It's loaded with homegrown fruits and vegetables such as zucchini, eggplant, tomatoes, and fava beans that may reduce the risk of heart disease and colon cancer. Also on the table: dairy products such as milk from grass-fed sheep and pecorino cheese, which, like fish, contribute protein and omega-3 fatty acids. Tonino still makes wine from his small vineyard of Cannonau grapes, which in this mountainous part of Sardinia contain two to three times as much of a component found in other wines that may prevent cardiovascular disease.



- The isolation of these mountain villages has helped preserve a traditional Sardinian way of life—one that promotes longevity.

Stay Active

A little work won't kill you. That's a life lesson taught early in Sardinia, where young Antonio Saba helps tend his family's flock. By keeping active, many men stay as healthy as Giuseppe Cugusi, who at 85 is still raising pigs—one-handed, if need be. "I've been walking and working all my life, even when I don't feel great," he says. "If I stayed home all day, then I'd be sick."

But with globalization and modernization, even remote Sardinia is changing. Cars and trucks have eliminated the need to walk long distances. Young people are more outward-looking and less traditional. Obesity, virtually nonexistent before 1940, now afflicts about 10 percent of Sardinians. "Children want potato chips and pizzas. That's what they see on TV," says Tonino. "Bread and pecorino are old-fashioned."

One thing that hasn't changed: the Sardinians' dedication to family, which assures both support in times of crisis and life-extending care for the elderly. "I would never put my father in a retirement home," says Tonino's daughter Irene. "It would dishonor the family."

For Tonino, the workday still includes a late afternoon trek to pasture his 200 sheep. Looking jaunty in his cap, coat, and leather gaiters, he strides through a narrow opening in a stone wall, counting his sheep as they follow him. When three sheep try to squeeze through, they knock over a section of the wall. With disquieting ease, Tonino hoists the heavy rocks back into place. Then he leans back on a rock outcropping and assumes the age-old role of sentinel, a routine he has performed for many decades.

"Do you ever get bored?" I ask. Before the words leave my mouth, I realize I've uttered a heresy. Tonino swings around, pointing at me, dried blood still rimming his fingernail, and booms: "I've loved living here every day of my life."



- **Good genes also help: roughly eight in ten Sardinians are directly related to the original Sardinians.**



- Okinawan seniors have far fewer heart attacks than their U.S. counterparts and lower rates of breast and prostate cancer.

Okinawans



Find Purpose

What is 84-year-old Fumiyasu Yamakawa's *ikigai*—his "reason for living"? Daily exercise, including yoga (right), to train for an annual decathlon. His favorite events: high jump and pole vault. For Zen-ei Nakamura, 88 (below), the sea beckons. "Fishing is my life," he says. He immerses himself in his work—often skin diving to scare fish into his nets.

The first thing you notice about Ushi Okushima is her laugh. It begins in her belly, rumbles up to her shoulders, and then erupts with a hee-haw that fills the room with pure joy. I first met Ushi five years ago at her home in Okinawa, and now it's that same laugh that draws me back to her small wooden house in the seaside village of Ogimi. This rainy afternoon she sits snugly wrapped in a blue kimono. A heroic shock of hair is combed back from her bronzed forehead revealing alert, green eyes. Her smooth hands lie serenely folded in her lap. At her feet sit her friends, Setsuko and Matsu Taira, cross-legged on a tatami mat, sipping tea. Since I last visited Ushi, she's taken a new job, tried to run away from home, and started wearing perfume. Predictable behavior for a young woman, perhaps, but Ushi is 103. When I ask about the perfume, she jokes that she has a new boyfriend, then claps a hand over her mouth before unleashing one of her blessed laughs.



With an average life expectancy of 78 years for men and 86 years for women, Okinawans are among the world's longest lived people. More important, elders living in this lush subtropical archipelago tend to enjoy years free from disabilities. Okinawans have a fifth the heart disease, a fourth the breast and prostate cancer, and a third less dementia than Americans, says Craig Willcox of the Okinawa Centenarian Study.

What's the key to their success? "*Ikigai* certainly helps," Willcox offers. The word translates roughly to "that which makes one's life worth living."


TRACK & FIELD



Keep Friends

The circle remains unbroken for 102-year-old Kamada Nakazato, whose family and friends join her for a cup of tea several times a week. Studies suggest that seniors who stay social are less prone to heart disease and depression. A health threat looms for anyone who lines up for a regular fast-food fix (right): Younger Okinawans have one of Japan's highest rates of obesity.



Older Okinawans, he says, possess a strong sense of purpose that may act as a buffer against stress and diseases such as hypertension. Many also belong to a Okinawan-style *moai,* a mutual support network that provides financial, emotional, and social help throughout life.

A lean diet may also be a factor. "A heaping plate of Okinawan vegetables, tofu, miso soup, and a little fish or meat will have fewer calories than a small hamburger," says Makoto Suzuki of the Okinawa Centenarian Study. "And it will have many more healthy nutrients." What's more, many Okinawans who grew up before World War II never developed the tendency to overindulge. They still live by the Confucian-inspired adage *"hara hachi bu*—eat until your stomach is 80 percent full."

And they grow much of their own food. Taking one look at the gardens kept by Okinawan centenarians, Greg Plotnikoff, a traditional-medicine researcher at the University of Minnesota, called them "cabinets of preventive medicine." Herbs, spices, fruits, and vegetables, such as Chinese radishes, garlic, scallions, cabbage, turmeric, and tomatoes, he said, "contain compounds that may block cancers before they start."

Ironically, for many older Okinawans this diet was born of hardship. Ushi Okushima grew up barefoot and poor. Her family scratched a living out of Ogimi's rocky terrain, growing sweet potatoes, which formed the core of every meal. To celebrate the New Year, her village butchered a pig, and everyone got a morsel of pork.

During World War II, when U.S. warships shelled Okinawa, Ushi and Setsuko, whose husbands had been conscripted into the Japanese Army, fled to the mountains with their children. "We experienced terrible hunger," Setsuko recalls.

Ushi now wakes every morning at six and eats a small breakfast



- *Moai:* A group of friends, neighbors, or others who get together regularly to provide reciprocal support—social, emotional, and financial.

Eat Vegetables

When she's not watching sumo wrestling on TV, Yasu Itoman, 100, gets her own exercise by growing onions, tomatoes, carrots, and other herbs and vegetables in her garden. They give her natural antioxidants that may help prevent cancer. In his garden, Seiryu Toguchi, 104, savors a few minutes of sun—a source of vitamin D, which can help prevent osteoporosis. Why the red gloves? They're easy to find.

of milk, bananas, and tomatoes. Until very recently she grew most of her food (she gave up gardening when she took a job). But her tradition-honored daily rituals haven't changed: morning prayers to her ancestors, tea with friends, lunch with family, an afternoon nap, a sunset social hour with friends, and before bed a cup of sake infused with the herb mugwort. "It helps me sleep," she says.

Back in Ushi's house we're finishing our tea. Outside, dusk is falling; rain patters on the roof. Ushi's daughter, Kikue, who is 78 and finds little amusement in the attention her mother draws, shoots me a glare that I take to mean "you've overstayed your welcome." (When Ushi ran away from home, she was actually fleeing an argument with Kikue. She packed a bag and boarded a bus without telling her daughter. A relative caught up with her in a town 40 miles away.)

Ushi, Setsuko, and Matsu take the cue and fall silent in unison. These women have shared each other's fortunes and endured each other's sorrows for nearly a century and now seem to communicate wordlessly.

What is Ushi's ikigai, I ask—that powerful sense of purpose that older Okinawans are said to possess?

"It's her longevity itself," answers her daughter. "She brings pride to our family and this village, and now feels she must keep living even though she is often tired."

I look to Ushi for her own answer.

"My ikigai is right here," she says with a slow sweep of her hand that takes in Setsuko and Matsu. "If they die, I will wonder why I am still living."



Elder Okinawan women are respected spiritual leaders in many villages, a role that gives them a greater sense of purpose.



- Regular churchgoers appear to live as much as two years longer than non-churchgoers.

Adventists

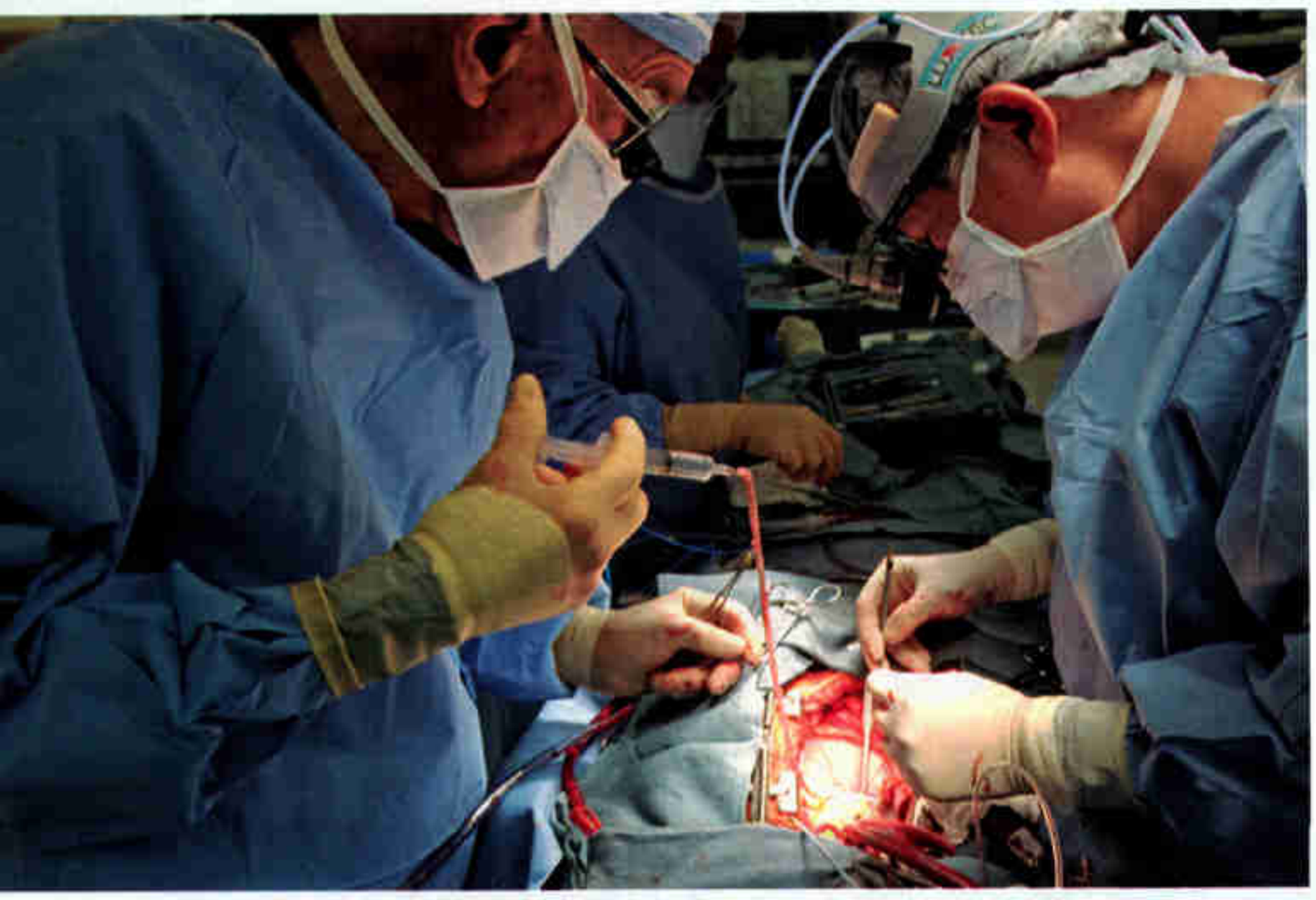


Have Faith

Baptizing a believer, Seventh-day Adventist pastor Scott Smith (right) says spiritual and physical health go hand in hand. "To accept Christ is to be free, which reduces stress." Indeed, says Dr. Ellsworth Wareham, who at 91 still assists with heart surgery (below, at left): "God directs, and God protects."

It's Friday morning, and Marge Jetton is barreling down the San Bernardino Freeway in her mauve Cadillac Seville. She peers out the windshield from behind dark sunshades, her head barely clearing the steering wheel. Marge, who turned 101 in September, is late for one of several volunteer commitments she has today, and she's driving fast. Already this morning she's walked a mile, lifted weights, and eaten her oatmeal. "I don't know why God gave me the privilege of living so long," she says, pointing to herself. "But look what he did."

God may or may not have had something to do with Marge's vitality, but her religion has. Marge is a Seventh-day Adventist. We're in Loma Linda, California, halfway between Palm Springs and Los Angeles. Here, surrounded by orange groves and usually blanketed in mustard-colored smog, lives a much-studied concentration of Seventh-day Adventists.



The Adventist Church—born during the era of 19th-century health reforms that popularized organized vegetarianism, the graham cracker, and breakfast cereals (John Harvey Kellogg was an Adventist when he started making wheat flakes)—has always preached and practiced a message of health. It expressly forbids smoking, alcohol consumption, and eating biblically unclean foods, such as pork. It also discourages the consumption of other meat, rich foods, caffeinated drinks, and "stimulating" condiments and spices. "Grains, fruits, nuts, and vegetables constitute the diet chosen for us by our Creator," wrote Ellen White, an early figure who



Take Time Off

The Rawson family of Colton, California, downshifts together on the weekend, with church on Saturday, the Adventists' Sabbath, an afternoon hike, and a dash on their dirt bikes on Sunday. It's their way of heeding God's fourth commandment to remember the Sabbath and keep it holy. "If the day wasn't special," says Tim, the dad, "I'd just be mowing my yard."



helped shape the Adventist Church. Adventists also observe the Sabbath on Saturday, socializing with other church members and enjoying a sanctuary in time that helps relieve stress. Today most Adventists follow the prescribed lifestyle—a testimony, perhaps, to the power of mixing health and religion.

From 1976 to 1988 the National Institutes of Health funded a study of 34,000 California Adventists to see whether their health-oriented lifestyle affected their life expectancy and risk of heart disease and cancer. The study found that the Adventists' habit of consuming beans, soy milk, tomatoes, and other fruits lowered their risk of developing certain cancers. It also suggested that eating whole wheat bread, drinking five glasses of water a day, and, most surprisingly, consuming four servings of nuts a week reduced their risk of heart disease. And it found that not eating red meat had been helpful to avoid both cancer and heart disease.



In the end the study reached a stunning conclusion, says Gary Fraser of Loma Linda University: The average Adventist lived four to ten years longer than the average Californian. That makes the Adventists one of the nation's most convincing cultures of longevity.

I meet Marge at the Plaza Place hair salon in Redlands, where she's kept an 8 a.m. appointment with stylist Barbara Miller every Friday for the past 20 years. When I arrive, Marge is flipping through a copy of *Reader's Digest* as Barbara uncurls a silver lock of hair. "You're late!" she shouts. Behind Marge a line of stylists languidly coif other heads of hair, all in varying shades of gray. "We're a bunch of dinosaurs around here," Barbara whispers to me. "You may be," Marge shoots back. "Not me."

Half an hour later, her hair a cottony tuft, Marge leads me to her car. She doesn't walk, quite, but scoots with a snappy, can-do shuffle. "Get in," she orders. "You can help." We drive to the Loma Linda adult services center, a day-care center for seniors, most of whom are several decades younger than Marge. She pops open her trunk and heaves out four bundles of magazines she's collected during the week. "The old folks here like to read them and cut out the pictures for crafts," Marge explains. Old folks?

Next stop: delivering recyclable bottles to a woman on welfare who will later redeem them for deposits. On the way Marge tells

Celebrate Life

"The Bible tells you not to eat pork," says Lydia Newton (right), who prefers beans, cheese, bread, and a slice of birthday cake (below). Newton, 112, ranks among the world's 20 oldest people, three years shy of the list leader. Supercentenarians are redefining how long and well we can live, but it's not easy work. "My favorite part of the day," says Lydia, "is when I take a nap."

me she was born poor, to a mule skinner father and homemaker mother in Yuba City, California. She remembers the 1906 San Francisco earthquake, when she was just a toddler, and the aftershock that reached her family farm and sloshed water out of the animal trough. She worked as a nurse, put her husband through medical school, and raised two children as a doctor's wife. Her husband, James, died two days before their 77th anniversary. "Of course I feel lonely once in a while, but for me that's always been a sign to get up and go help somebody."

Like many Adventists, Marge spends most of her time with other Adventists. "It's difficult to have non-Adventist friends," she says. "Where do you meet them? You don't do the same things. I don't go to movies or dances." As a result, researchers say, Adventists increase their chances for long life by associating with people who reinforce their healthy behaviors.

At noon, back at Linda Valley Villa, where Marge lives in a community of retired Adventists, she treats me to lunch. We sit by ourselves, but a stream of neighbors stop by to say hello. Over tofu casserole and mixed green salad, I ask Marge to share her longevity wisdom.

"I haven't eaten meat in 50 years, and I never eat between meals," she says, tapping her perfect teeth. "They're all mine." Her volunteer work helps her avoid the life-shortening loneliness suffered by so many seniors—and gives her a sense of purpose, which imbues the lives of other successful centenarians. "I realized a long time ago that I needed to go out to the world," she says. "The world was not going to come to me."

I have a last question for Marge. After interviewing more than 50 centenarians on three continents, I've found every one likable; there hasn't been a grump in the bunch. What's the secret to a century of congeniality?

"Well, I like to talk to people," she says. "I look at strangers as friends I haven't met yet." She pauses to rethink her answer. "Then again, people may look at me and wonder, Why doesn't that woman keep her mouth shut!" □



JOIN AN INTERACTIVE QUEST

with author Dan Buettner as he and a team of experts return to Okinawa to probe the secrets of long life. Go online daily from October 31 to November 11 at **ngm.com/longevity** and cast your vote to direct the team's exploration. • Return the next day and watch the quest unfold in video posted from the field. • Then join the discussion board: What are the links between lifestyle and longevity? **Plus:** Enjoy Sights & Sounds with photographer David McLain.



Autumn in Acadia

NATIONAL PARK



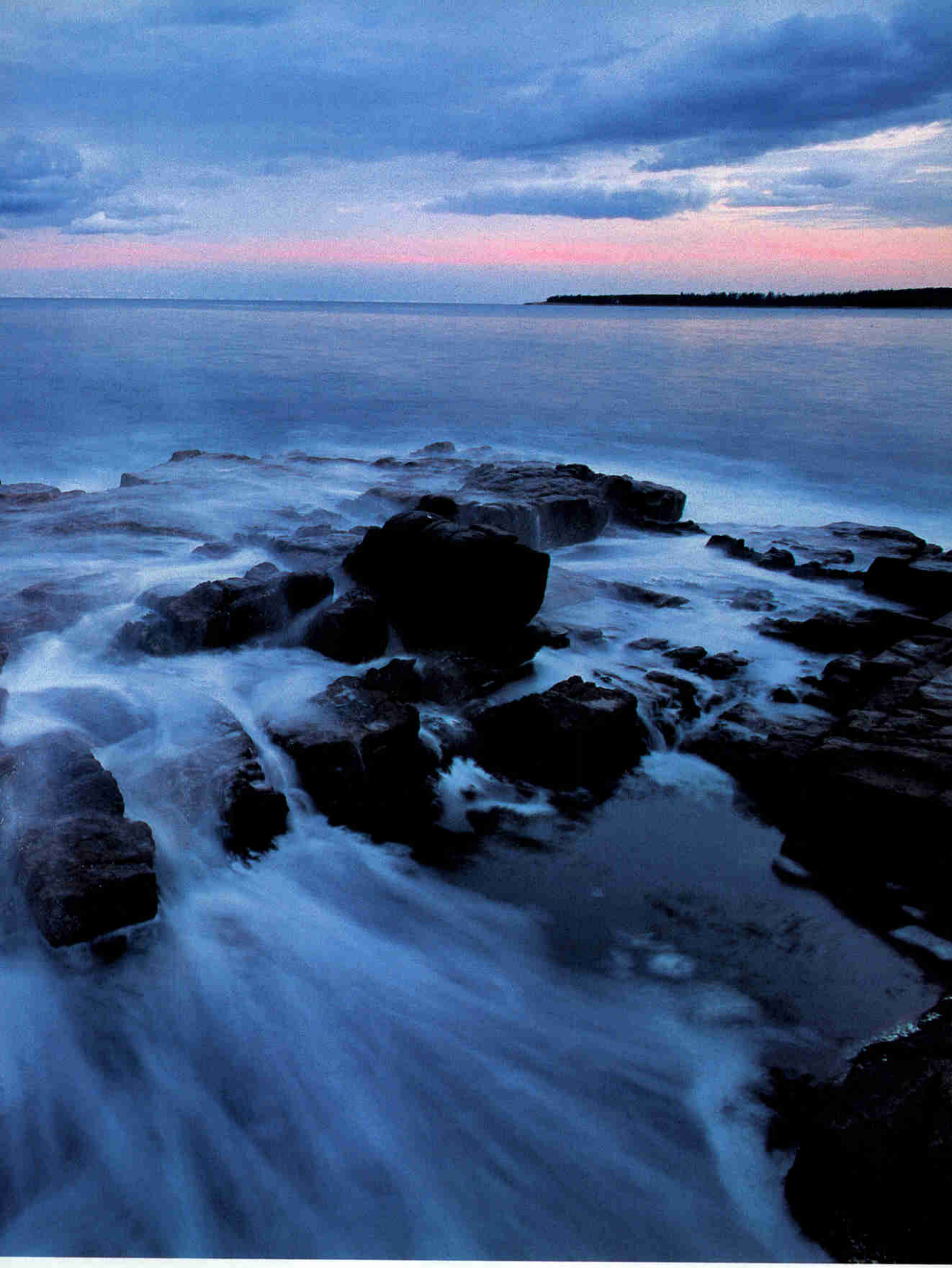
FOREST FIRE



Maples flare into scarlet prominence as fall sweeps through Acadia National Park. Bright days and cold nights ignite pyrotechnic foliage displays across this Maine preserve of coastal mountains, deep lakes, and rocky coves—the first national park established east of the Mississippi.



ICE AGE LEGACY



Waters washing the shore near Ship Harbor rarely warm beyond 60°F, a chill reminder of glacial forces that sculpted Acadia's ancient bedrock. A creeping sheet of ice up to 4,000 feet thick ground down mountains, gouged out valleys, and carried loads of rock nearly 400 miles out to sea.



BY JOHN G. MITCHELL

PHOTOGRAPHS BY MICHAEL MELFORD

The two of us go back a long way, Acadia and I, half a century and then some. She scared me half to death that first time out—me, the vertiginous flatlander recklessly flouting acute acrophobia one foggy morning on the park's most precipitous trail. Then, on safer ground, she seduced me with her variegated forests and glimmering ponds and surf-splashed headlands, and I found myself, over the years, going back to search out her secret places and scenic vistas again and again. She'll hook you too, if you give her a chance. And watch yourself, in particular, if you should happen that way when autumnal incandescence begins to glow across the domed ridges and U-shaped valleys of Acadia National Park. You like fall foliage, Yankee style? Acadia deals a royal flush almost every time.

Anchored on Maine's Mount Desert Island, a bit under 200 air miles northeast of Boston, Acadia, at some 47,000 acres, is one of the smallest of the national parks but ranks among the most visited. There are several outlying parts: the granite ledges of the Schoodic Peninsula across Frenchman Bay, and a number of smaller offshore islands, notably Isle au Haut in the Gulf of Maine. But Mount Desert, linked as it is by causeway to the mainland, is where you'll find the most accessible action. The 20-mile Park Loop Road beckons visitors to many of the island's popular attractions: More than 20 lakes and ponds, a spur road to the top of Cadillac Mountain (at 1,530 feet, the highest of Acadia's some half dozen promontories rising more than a thousand feet above the sea), a place called Sand Beach (the park's only non-rocky,

To preserve landscapes they loved—like the valley cradling Round Pond (left)—a group of philanthropists in 1913 gave the nation a gift: 5,000 acres on Mount Desert Island that would become the core of Acadia National Park. The park now embraces some 47,000 acres and stretches from Schoodic Peninsula to Isle au Haut.



ACADIA NATIONAL PARK

saltwater swimming hole where the uninitiated bather can turn a 55-degree shade of blue), and a salubrious waterside retreat known as the Jordan Pond House, which famously serves what may well be the world's most succulent popovers. My two daughters, then youngsters, still recall one sunny afternoon at the pond nibbling the dirigible pastries' buttery flakes as squadrons of yellow jackets swarmed down to strafe their bowl of strawberry jam.

But the story of Acadia can't be limited to cold waters, warm popovers, and heady mountain views. Its real story is about people—the ones who got so much of the island ready to become a park even before there was a National Park Service to look after it, and the ones today who, by donations of daywork and dollars, carry on the Acadian tradition. "This park is the model for citizen participation," says Sheridan Steele, Acadia's superintendent. About 3,500 nonsalaried volunteers perform 40,000 hours of service over the course of a year, not to mention substantial financial assistance flowing from the nonprofit Friends of Acadia. "This is where philanthropy in the national parks started," says Steele. "Without it, Acadia as we know it might never have happened."

Going way, way back, of course, the story of Acadia had nothing to do with park making and everything to do with homemaking, initially by Native Americans whose middens date back at least 5,000 years, and then by the French, whose sailcloth rover,



PATHS LESS TRAVELED



Solitude beckons down a birch-and-sedge-lined path. One of the smallest U.S. national parks is also among the most popular, with 2.2 million visitors a year. A 135-mile network of hiking trails and 44 miles of carriage roads—open only to pedestrians, horses, and bicycles—offer respite from traffic.



CLINGING TO LIFE

Plush moss creeps over roots and rocks on isolated Isle au Haut (above). On the summit of 1,530-foot Cadillac Mountain (right)—highest point on the Atlantic coast—ruddy wild huckleberry bushes and multihued lichens thrive among windswept boulders and scant patches of thin, acidic soil.

Samuel de Champlain, scouting the Maine coast in 1604, pronounced a certain island's mountains to be "all bare and rocky" and dutifully dubbed the place Isle des Monts Deserts. But European settlement here never quite caught on over the next 150 years while colonial French and English wrestled for control of the territory. Finally, in 1761, a handful of English staked a claim at the north end of Somes Sound, and it wasn't long before Mount Desert was speckled with villages, lumber mills, fish-drying racks, and shipyards.

Tourists began arriving in the mid-19th century. Among the first were a couple of brushstroke masters from the Hudson River school, the artists Thomas Cole and Frederic Church. Their land- and seascapes (Cole's brush favored Frenchman Bay) alerted America to the wonders of the island, and in the 1890s tourism became a flourishing industry. Mount Desert sprouted vacation hotels and elegant seaside "cottages" for such privileged patricians as Rockefellers, Vanderbilts, and Astors.

One fine estate in Bar Harbor was built by the Dorr family of Boston. Young George B. Dorr, a Harvard graduate and an ardent conservationist, was alarmed by the increasing pace of development across the island. To counter it—and to preserve land for public use—he and several affluent colleagues founded the Hancock County Trustees of Public Reservations. By 1913 the corporation had acquired some



5,000 acres, including lands donated by Dorr. The trustees then offered the tract to the federal government, and in 1916, the year the National Park Service was established, President Woodrow Wilson declared the donated land a national monument. Three years later, as more acreage was added to the monument, the government made it a national park, the first east of the Mississippi, and later renamed it Acadia, in memory of the maritime colony France lost to Britain in the 18th century.

NOTHING LINKS THE PAST AND PRESENT of Acadia quite so much as the challenge of moving people around the park—on hiking trails, on carriage paths, and along the conventional roads that had never heard the clatter of internal combustion until Maine lifted its island-wide ban on motor vehicles in 1915. The organization Friends of Acadia, headquartered at Bar Harbor, is helping the Park Service meet the challenge on each of these fronts.

Many of the island's trails predate the park, having served as connectors between some of the roadless villages. But as recreational hiking came into vogue, George Dorr and his colleagues began to introduce stone stairways and iron rung ladders to conquer the cliffs of the taller mountains. I didn't know it at the time of my own ascent that long-ago morning, but a fellow named Rudolph Brunnow conceived the wicked design of the Precipice Trail, an almost vertical thousand-foot climb up the eastern escarpment of Champlain Mountain. Fortunately, the fog obscured everything except the granite in front of my face and the next iron rung awaiting my outstretched hand. Don't look down, the climber below me kept repeating unnecessarily. And don't look up, warned the one above me.

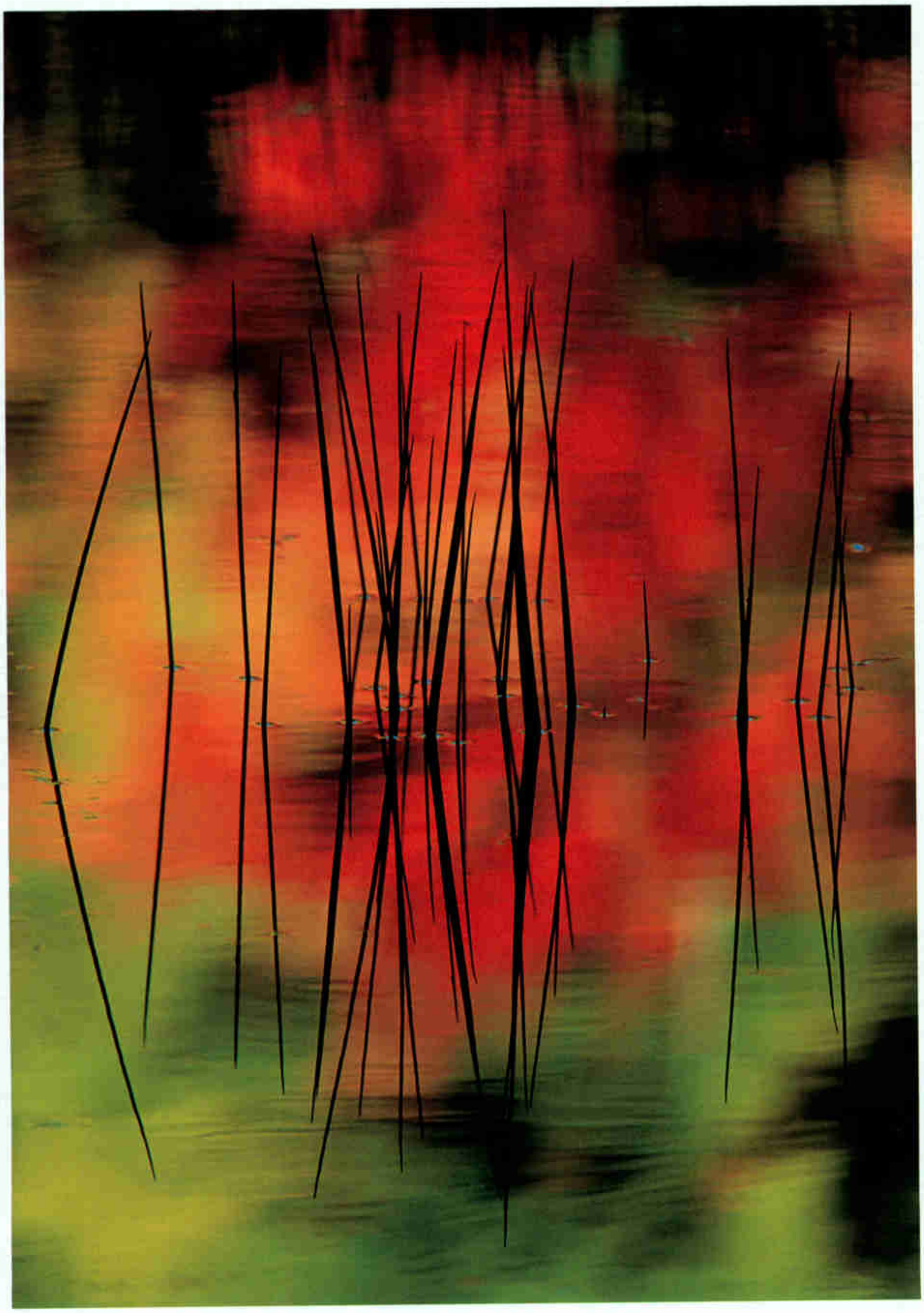
Now, with time marching on and with a handsome endowment from Friends of Acadia, park crews and volunteers are rehabilitating the park's 135-mile trail system and resurrecting some older trails long abandoned. *(Continued on page 44)*



FACING THE SEA



Rock climbers often test their skills against the jagged face of Otter Cliff. They're the latest in a nearly century-long line of visitors drawn to Acadia, of which park booster Theodore Roosevelt wrote in 1918, "It will give a healthy playground to multitudes of hard working men and women."



PURE WATER

Reflected foliage paints the surface of Eagle Lake (above), and maples redden against the backdrop of a rainstorm-fed cascade (right). Protecting water quality is a crucial Park Service task here: Acadia's lakes and ponds provide water for nearly 11,000 year-round residents of Mount Desert Island.





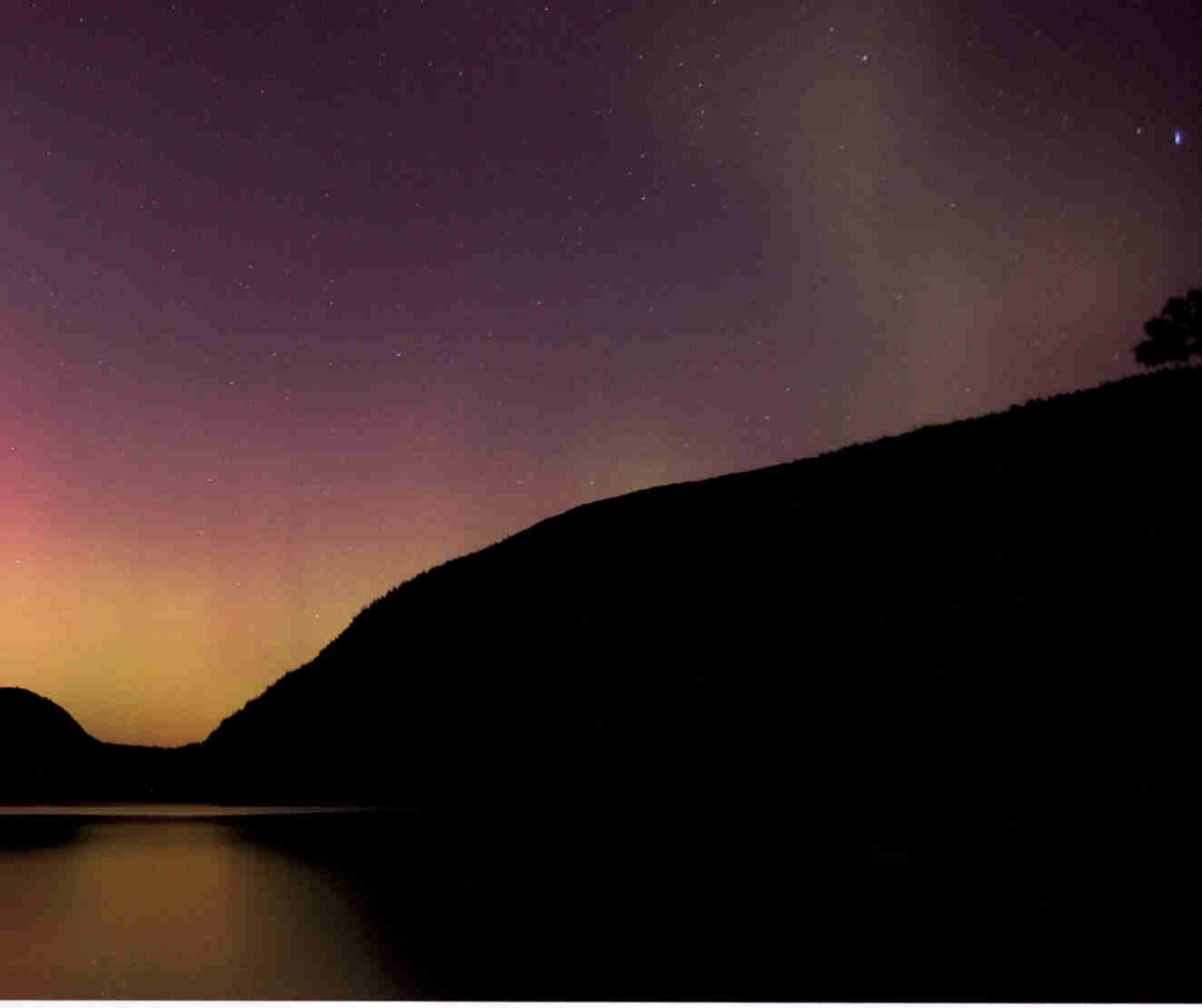
NORTHERN LIGHT

As nightfall steals autumn's fire from the hillsides flanking Jordan Pond on a late October evening, an intense aurora swirls its own colors across the sky. "It was my last night in Acadia, and this incredible show went on for half an hour," says photographer Michael Melford. "It was a gift."

As for my old nemesis, the Precipice Trail, it continues to chill and thrill climbers to this day, though the Park Service suspends its use mid-March through mid-August to protect nearby nests of peregrine falcons.

A Friends endowment also maintains the park's winding carriage roads, open to hikers, bikers, and equestrians but not to motorists. These byways are the legacy of John D. Rockefeller, Jr., who purchased a summer home at Seal Harbor in 1910, cherished the island's motorless serenity, and enjoyed exploring Mount Desert by horse and carriage. Over the next 27 years, Rockefeller and his wealth presided over the construction of an extensive network of narrow carriage roads, surfaced with hand-laid stones and bordered with rough-cut blocks of granite—rustic guardrails some islanders affectionately call "Rockefeller's teeth."

And finally there are those other roads, including the Loop and the run up Cadillac Mountain. For years they have taken a pounding as hundreds of thousands of



cars poured across the mainland causeway, creating backups and fouling the air. Notices are occasionally posted on busy summer days advising visitors that ozone has exceeded safe levels. But here, once again, park supporters have pitched in to ease the strain. Following an example first set at Yosemite Valley to get visitors out of their cars, Acadia since 1999 has operated a fleet of propane-fueled shuttle buses (17 now *in service*) and dramatically increased the number of folks happy to leave the driving to others. "It's going gangbusters," says Ken Olson, president of Friends of Acadia. "In its first six years the program has picked up a million and a half riders. That adds up to more than half a million vehicles off the park's roads—enough cars to stretch from here all the way down the coast to Charleston, South Carolina."

The shuttle service now extends into October to enhance the visitor's experience of Acadia's autumn palette: the golds and yellows of birch, beech, and aspen, the reds and russets of maple weaving their way across a black-green tapestry of spruce and fir. But wait! Don't turn away when those deciduous leaves begin to shrivel and flutter from the hardwood trees. There'll be new secret places and scenic vistas to enchant your eye in the forest openings. After all, when autumn retreats from Acadia, wonders of a different sort won't be far behind. □

ONLINE EXTRAS Planning a trip to Acadia? Get travel tips on places to stay and things to do, including hiking and birding. Also download images of the park for your computer's desktop, and read about the great fire of 1947 that destroyed many of Mount Desert's grandest homes. All at **ngm.com/0511**.



INSIDE NEPAL'S REVOLUTION

WHO ARE THE MAOISTS, AND WHY HAVE THEY TURNED THIS HIMALAYAN KINGDOM INTO A KILLING ZONE?

The Maoist star crowns a teenage girl swept up in the violent movement to oust Nepal's monarchy. To converts the rebels promise land and equality. To enemies they vow death.



NEPAL'S EMBATTLED KING DEMANDS ORDER—OR ELSE

Armed with anger, a trekking guide takes aim as the face of Nepal's autocratic leader, King Gyanendra, beams into a café in the capital, Kathmandu. Calling his actions necessary to crush the Maoist insurgency, the king declared a state of emergency earlier this year, outlawing dissent. Travelers, fearful of violence, are growing scarcer, gutting the economy.

BY ED DOUGLAS PHOTOGRAPHS BY JONAS BENDIKSEN

Comrade Ranju is standing on a sunlit hilltop in western Nepal, telling me how she'd come to kill more than a dozen paramilitary policemen in one night. Dressed in fatigues, she's tall and strong for a 19-year-old Nepali woman, and her straight black hair is scraped back severely from her forehead. For the past three years she's roamed these mountains as a soldier in the Maoist army, whose brutal tactics have spread terror throughout the kingdom. Ranju is describing an assault in September 2002 in Sindhuli district, 50 miles southeast of Nepal's capital, Kathmandu. Her unit was besieging a police station just before midnight. After seeing several comrades gunned down, she came upon a line of policemen. "They didn't surrender," she says. "They were still firing." She claims to have killed 16 or 17 officers with her semiautomatic rifle. In all, 49 police and 21 Maoists were killed.



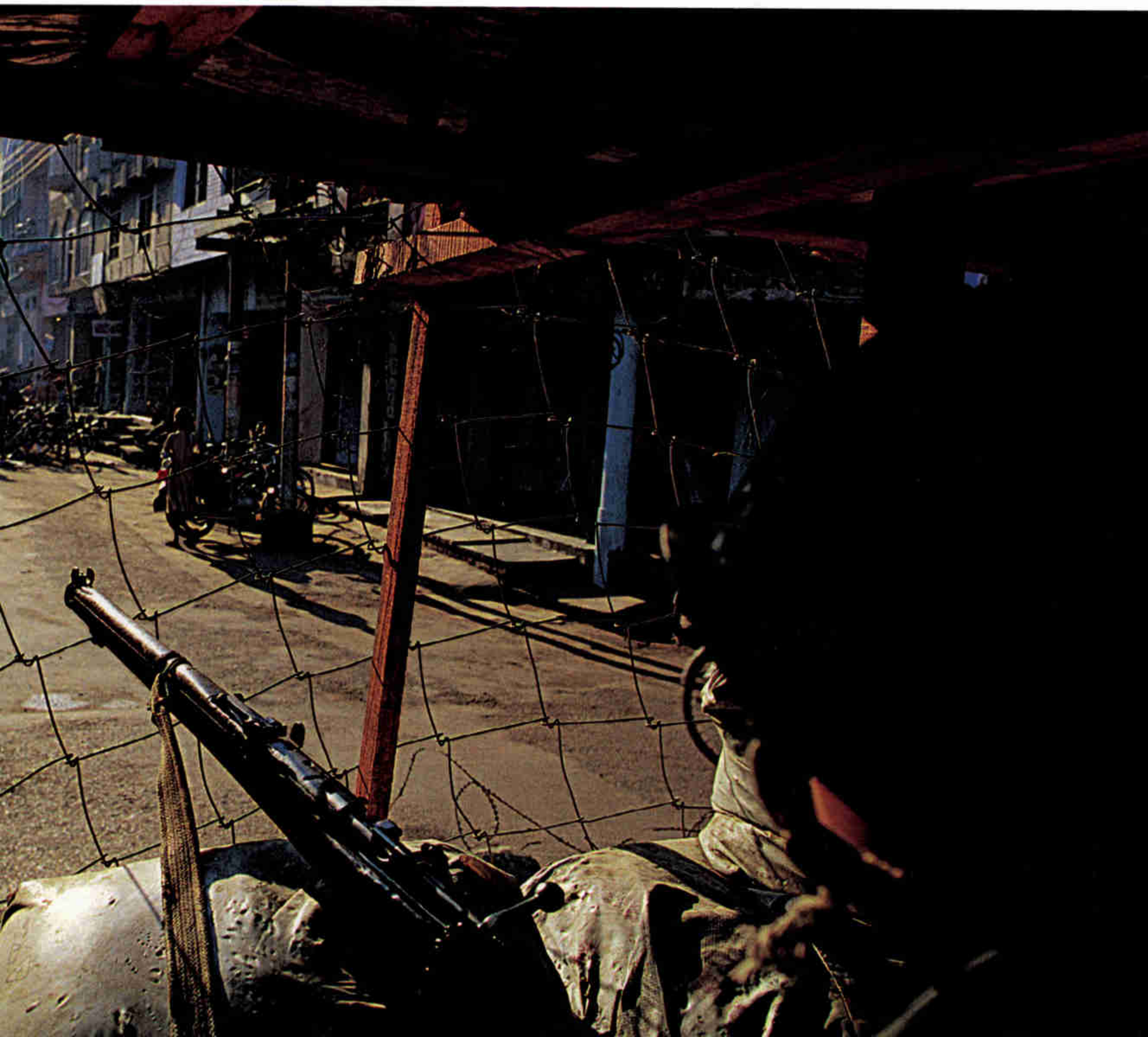
As she remembers the battle, Ranju becomes so vehement that another rebel steps in to calm her. "We don't kill people if they throw down their arms," he says. "There are many instances of us giving garlands to soldiers and police who surrender." But Ranju's eyes still glare fiercely. Born in eastern Nepal, she'd joined the Maoists at 15 after being harassed by government security forces. Her father had been an active Communist, and she was suspected of contact with the rebels. "People used to point fingers at girls like me," she says, referring to her independent attitude. "Most Nepali women are oppressed. Many end up as prostitutes in Bombay [Mumbai], or are beaten. It has to be changed." The other women soldiers standing near Ranju nod in agreement. She's a natural leader, and I sense that in other circumstances she might have made an excellent teacher—or police officer.

What's happened to Nepal, that young people like Ranju are killing each other with such fervor? And what future does the nation have, now that its ruler, King Gyanendra, has retaken absolute control, ending 12 years of government by political parties? This past February, supported by the Royal Nepalese Army (RNA), the king declared a state of emergency, briefly closing the international airport in Kathmandu, cutting off telephones and e-mail, and placing politicians under house arrest—all in the name of fighting the Maoists. In response, the rebels called a nationwide strike and continued their campaign of violence. The Himalayan kingdom seems poised on the brink.

THE MAOIST INSURGENCY was born in the poverty of rural Nepal, with the first attacks against government posts taking place in 1996. The Maoists, an extremist faction among various communist groups, were led by a former agricultural student and teacher named Pushpa Kamal Dahal, who assumed the nom de guerre Prachanda. Now in his early 50s, he's rarely seen in public and almost never photographed.

When Nepal's democratic government ordered crackdowns on Prachanda's band of militants, the police were indiscriminately vicious. Suspects were tortured, villagers driven from their homes, and women raped. As the rebellion spread, the government's campaign widened. Security forces fired on a primary school in Jajarkot district during an evening dance performance. Killings mounted, and support for the Maoists grew. The rebels recruited a spectrum of disenfranchised Nepalis—women, ethnic

Uncertain of friend or enemy, a policeman guards a barricade in the unquiet city of Nepalganj. During the photographer's stay, Maoists set off bombs every night and raided a television station, displaying an ability to terrorize cities.



REVOLUTION FEVER STIRS RURAL NEPAL

"The red flag will wave from Mount Everest," rebel leaders vowed to supporters rallying under a communist banner in western Nepal, heartland of the insurrection. Urging the crowd to rise up against capitalism and a corrupt urban elite, speakers invoked the example of Mao Zedong, whose guerrilla forces led communists to victory in China in the 1940s.

minorities, Dalits (or Untouchables), the unemployed, and underemployed youths—offering them hope where there had been none.

Prachanda and his top rebel leaders are hard-core ideologues. They studied the works of Mao Zedong and—despite being disavowed by the Chinese government as not true Maoists—created a new Nepali version of Maoism, the Prachanda Path, a mélange of Mao's military strategy, Marxism, and Nepali patriotism. Prachanda himself commands both the People's Army and the rigidly hierarchical Maoist political wing. At the apex is a standing committee, supported by a politburo, central committee, regional bureaus, district committees, area committees, and cell committees.

The rebels' power grew as Nepal's hard-won democracy stumbled. Political parties, legalized in 1990 by Gyanendra's brother and predecessor, King Birendra, bickered and stuffed their own pockets. Nepalis developed a phrase for this graft, "Pajero culture," after a Japanese SUV favored by status-hungry politicians. Divided into a prosperous capital and an impoverished countryside, Nepal entered a tightening spiral of decline.

Then on June 1, 2001, something outlandish and awful happened. Birendra's son and heir, Crown Prince Dipendra, deranged by drink and perhaps drugs and armed with an assortment of weapons, shot dead his father and mother, his brother and sister, and five others. Then he reportedly turned the pistol on himself. Gyanendra was declared king.

Into this disarray marched young Ranju and her comrades—disciplined, committed, and ruthless. With an army estimated at 12,000, the Maoists spread to all 75 districts of the country. Entrenched in classic guerrilla terrain from which the RNA has been unable to dislodge them, the Maoists have become a force in most rural areas, leaving control of Kathmandu and district capitals to the government. In all, nearly 13,000 people have been killed by the state and insurgents, and millions of villagers remain caught in the deadly cross fire.

Nepal

- *Population:* ***27 million***
- *Percent of Nepalis who live below the national poverty line:* ***31***
- *Rank of Nepal among poorest nations in South Asia:* ***1st***
- *Percent tourist numbers have dropped since 1998:* ***38***
- *Nepalis killed by Maoists from 1996 to 2005:* ***4,500***
- *Nepalis killed by government in same period:* ***8,200***

"WE'RE BEING WATCHED all the time," the teacher says as we sit outside a teahouse in the village of Babiyachour in the western district of Surkhet. Chickens scratch at our feet, and water buffalo drag wooden plows through fields beyond the mud-and-straw houses. The village has no electricity, and the young girl who makes our tea boils water from a communal pump on a wood fire. Nervously fingering his glass, the teacher doesn't want to give his name and speaks softly, fearing he might be overheard by Maoist sympathizers. Everywhere, Maoist operatives depend on intimidation, extortion, and brutality to exercise control.





On the move for days, women rounded up by Maoists head to an indoctrination meeting in western Nepal. The bombed-out shell of a police station on a hillside near Kamal Bazar marks this area as rebel turf. In such places each family is expected to contribute at least one member to work for the Maoist cause.

"We're under pressure, not so much in the classroom, but in the village. People notice what contribution you make to political discussions."

Having just finished college in the nearby town of Birendranagar, the teacher was living outside the village, but local leaders told him to move closer to the school so they could watch him. Although Maoists control the region, he continues to draw his government salary of 4,000 rupees (about 60 dollars) a month, but he has to pay 5 percent to the insurgents—a tax levied wherever the Maoists are in control.

From the teahouse I can see the police station, a broken concrete shell daubed with Maoist graffiti. The police have fled from here, as they have from most of rural Nepal, and the village is now the front line, the first community I've seen that is openly controlled by the rebels. When photographer Jonas Bendiksen and I arrived in Babiyachour, we noticed a few Maoist soldiers buying aluminum plates and sacks of rice for hundreds of new recruits training on a hill above the village. One of the highest ranking Maoists, Comrade Diwakar, was said to have arrived for their "graduation." We sent our letters of introduction up the hillside, asking to meet him. Nobody seemed in a hurry to respond.

That night the Maoists hold a torchlit rally, and a young party member named Abhiral invites us to tag along. They're preparing to launch a strategic offensive against the government, he says, and the war is entering a new and final phase. Demonstrations like this are being organized in every village across Nepal. At the front of the column, grasping a torch, is my new friend the teacher, out to convince local party workers of his dedication. Each household has been compelled to provide one demonstrator, and ordinary villagers jostle in the center, mouthing slogans with half-clenched fists. A female Maoist rushes forward to encourage them, and shouts of "Down with American imperialism!" erupt again.

Next morning, an old Dalit stops to talk as we eat breakfast. Fifty years ago, he says, Babiyachour was nothing more than malaria-infested jungle prowled by tigers. His family helped clear the land, while the government sprayed DDT to kill mosquitoes. Now it's home to 500 people, too many to survive on farming, so more than 50 men from this village alone have gone to India looking for work, including two of the old man's five sons.

Before the fighting he'd been a blacksmith, he tells us. "But I tore up my license because the army was giving me trouble." Maoists regularly ordered blacksmiths to repair their firearms, making them targets for government security forces. "I'm petrified," he says. "I had to bury my tools." Now he relies on his small farm to feed his two wives, children, and grandchildren.

The whole village lives in fear of the day the RNA returns. The last time soldiers appeared, they shot an unarmed suspect as he fled. Earlier in Kathmandu I'd met many other victims of the conflict. Padam, a 34-year-old father of five told me how armed men describing themselves as Maoists had demanded 5,000 rupees (about 75 dollars) from each household in his village in Banke district in the southwest. Padam wasn't sure if they were really Maoists or just criminals posing as rebels. When strangers broke into his house in the middle of the night, he promised to pay up. "But the men dragged me into the street, laid my legs

Trash fires fight the cold in rebel-held Babiyachour, a village without electricity or running water. In many cases Maoists have made villages poorer by extorting taxes and taking food. Resisters who don't flee are often abducted and killed.



across a large stone, and dropped a tree trunk on them," he said. Months later, he's still in a wheelchair.

No one knows exactly how many displaced people there are in Nepal. Some organizations put the number as high as 200,000, with perhaps another 1.8 million who have fled the country. Many are politicians, bureaucrats, teachers, and health workers—community leaders associated with what Maoists call the old regime.

AS DAYS PASS IN BABIYACHOUR, we begin to doubt that we'll meet the shadowy Comrade Diwakar. Without written permission from the Maoists, no one can go anywhere in the territory beyond the village. Then, quite unexpectedly, a young rebel appears waving a message. We're to leave at once for an undisclosed location two hours away. We pack bags, hire a couple of porters, and start up the steep dirt track into the mountains.

We follow our guide up a forested hillside, emerging at a hamlet where terraced fields perch on a ridge. Moving through the ripening barley and potato fields, we see Maoist soldiers in combat fatigues carrying M16s and other automatic weapons. The quality of their guns marks them as an elite unit, Diwakar's bodyguards. More troops cluster around a single-story schoolhouse. Inside are three middle-aged men sitting at low student tables. The oldest is Comrade Diwakar, commander in charge of the Maoist western flank.



Diwakar is urbane and educated, with a handsome silver goatee. His given name is Poshta Bahadur Bogati, and like the man sitting next to him, the western division's commander, Comrade Prabhakar, he once ran unsuccessfully for parliament. Diwakar looks out of place in his fatigues, more like a professor than a guerrilla. Prabhakar, on the other hand, seems to be cultivating the look of a Nepali Che Guevara. They tell us they're open to journalists but complain that most "have followed the establishment line."

"We don't say we're perfect," Diwakar answers when I ask about the growing reports of Maoist human rights abuses. "There have been misdeeds among all levels of the party hierarchy. But there have been many achievements as well." The word "misdeeds" seems a cruel euphemism, considering that Maoists have routinely tortured victims—butchering them while they were still alive—and decapitated civilians accused of "sympathizing" with the establishment.

After half an hour of talk, the two leaders agree to let us trek through Maoist-controlled areas and to meet a group of rebel soldiers. We can see for ourselves, they say, the economic transformation they're delivering to

We see rice and lentils being doled out to hundreds of recruits and activists. Many of the recruits are children. Some look frightened, others grateful.



CIVILIAN DEATHS MOUNT
IN THE CROSS FIRE OF WAR



Villagers share the grief of Nankai Ahir, right, who wails at the funeral for her sister, accidentally shot during a battle between rebel and royal troops in Daulatpur. The insurgency has killed nearly 13,000 Nepalis, most of them civilians. What had been a small-scale conflict with primitive weaponry escalated in 2001 when the government militarized its ceremonial army and sent it on the attack.



Bodyguards of a rebel leader keep their rifles close during a press conference in the village of Binayak. Numbering about 12,000—a fraction of the royal army's size—Maoist troops have armed themselves with weapons captured from government posts.

the poor of Nepal. We're told to return to Babiyachour and wait for our guide.

Two days later Comrade Ilaaka, 21, arrives, assigned to lead us for the first few days of what turns out to be a four-week trek. He must have been handsome before a grenade exploded near his face, badly scarring his right eye. "During the fighting everything happens so suddenly," he says. "We were firing at the soldiers. They were retaliating. My friends were throwing grenades, so was the RNA. I didn't know where it came from, but some shrapnel hit me in the face." He's also been shot twice in the leg, and bullet scars crease both his arms.

Ilaaka tells us he'll take us to Achham district. He's carrying a request from Diwakar that we be allowed to talk with troops there. We can speak with anyone, discuss anything we want, as long as we don't ask for real names or reveal operational military information. As far as we know, few independent Western journalists have ever spent time with a Maoist army unit in this way. We presume they're hoping to improve their media profile.

Two hours from Babiyachour we reach the village of Gutu, where the Maoists have established a "new model market" of a hundred or so wattle-and-daub stalls displaying cheap Chinese goods from Kathmandu. "This is the Prachanda Path in action," boasts Bishwo Bandhu, the local commander. Compared with decades of neglect from the government, this may look like progress. But to me it seems a puny attempt at the kind of development the region really needs: better roads, electricity, health care, and good schools. Ironically, just up the hillside at a place called Chaukun, a Kathmandu company, Cosmos Cement Industries, announced in 2002 it would build a huge cement factory—the biggest industrial enterprise in western Nepal—creating thousands of jobs and generating taxes to fund infrastructure. The Maoist takeover wiped away those plans.

WE FOLLOW ILAAKA from Gutu on a four-hour climb through pine forests to a tiny village on the crest of a hill. After dark, lighted only by cooking fires and candles, the place feels medieval. Ilaaka had never been to school, he tells me. His parents needed help working their scrap of land in Kalikot to feed his four brothers and two sisters. "Then the police in our village started accusing innocent people of being Maoists," he says. "They beat us and made us carry loads for them." Local Maoist cadres visited his family at home, encouraging them to resist. "They taught us revolution."

Next morning Ilaaka leads us across the Karnali River into Achham district in far western Nepal. The mountains become more precipitous as we slog up the steep trail. Terraced plots give way to pasture. By sundown we reach Turmakhad, a scruffy, half-deserted village of stone huts turned into a Maoist staging post. At an abandoned police compound we see rice and lentils being doled out to hundreds of recruits and activists. Many are children. Some look frightened, others grateful for the food.



International watchdog groups document cases of Maoists abducting children for political indoctrination and as military recruits. Some have been used as human shields. But government forces also victimize children. I couldn't forget interviewing the grieving mother of Rupa Tharu, a 12-year-old girl dragged from her bed by drunken soldiers and shot outside her home in Bardiya district. Stories like that have become routine.

In the morning we meet Comrade Srijana, a tiny, fiercely determined 15-year-old girl who's been a party member for two years. The empty holes in her ears and nose show her decision to abandon her traditional culture. "Jewelry is a prison for us. It is a symbol of entrapment," she declares. "My sisters and I made our mother remove hers too." As she speaks, her feet tap along to Nepali pop music blaring from a radio in a village tea shop. "The only way forward is revolution," she says, aping her commanders. "Peace talks won't give us what we want." Then she turns her attention to a group of boys who are clearly intrigued by this spirited girl.

The Maoists feel safe in places like Turmakhad, where they live in abandoned houses or with villagers. To attack such an inaccessible target, the RNA would have to use helicopters, as they'd done a few months before, strafing a rally in a nearby village. Six people were killed, including a primary schoolteacher the Maoists had forced to attend the rally. Few villagers know much about Maoism, but they're all terrified of helicopters.

Such incidents are unfortunate but exaggerated, said Gen. Deepak Rana, the RNA's regional commander, when I'd met him in Nepalganj. "Our directives are to treat Maoist soldiers as brothers and sisters. We must do our best to disarm them. But when you're in the field you understand how difficult it is to implement these theories. I feel it when one or two stray cases are generalized by your media friends and human rights groups."

"Stray cases" may add up to hundreds, says Amnesty International,

"They called me an enemy of the people," said teacher Tara Bhattarai, describing the day when Maoist gunmen pulled him from his classroom and shot him. Recovering at a Kathmandu hospital, Bhattarai says he won't return to his village in Argakhachi district. He is one of many teachers targeted by Maoists as government loyalists.

WOMEN AIM FOR EQUALITY IN THE MAOIST ARMY

An uncamouflaged smile breaks out as women and men drill together in a rebel camp. Casualty figures show that on the Maoist side many females are now fighting—and dying—on the front lines. Rebel leaders attract female recruits with promises of equality, a condition rare in rural Nepal, where women are routinely denied education, health care, and political rights.

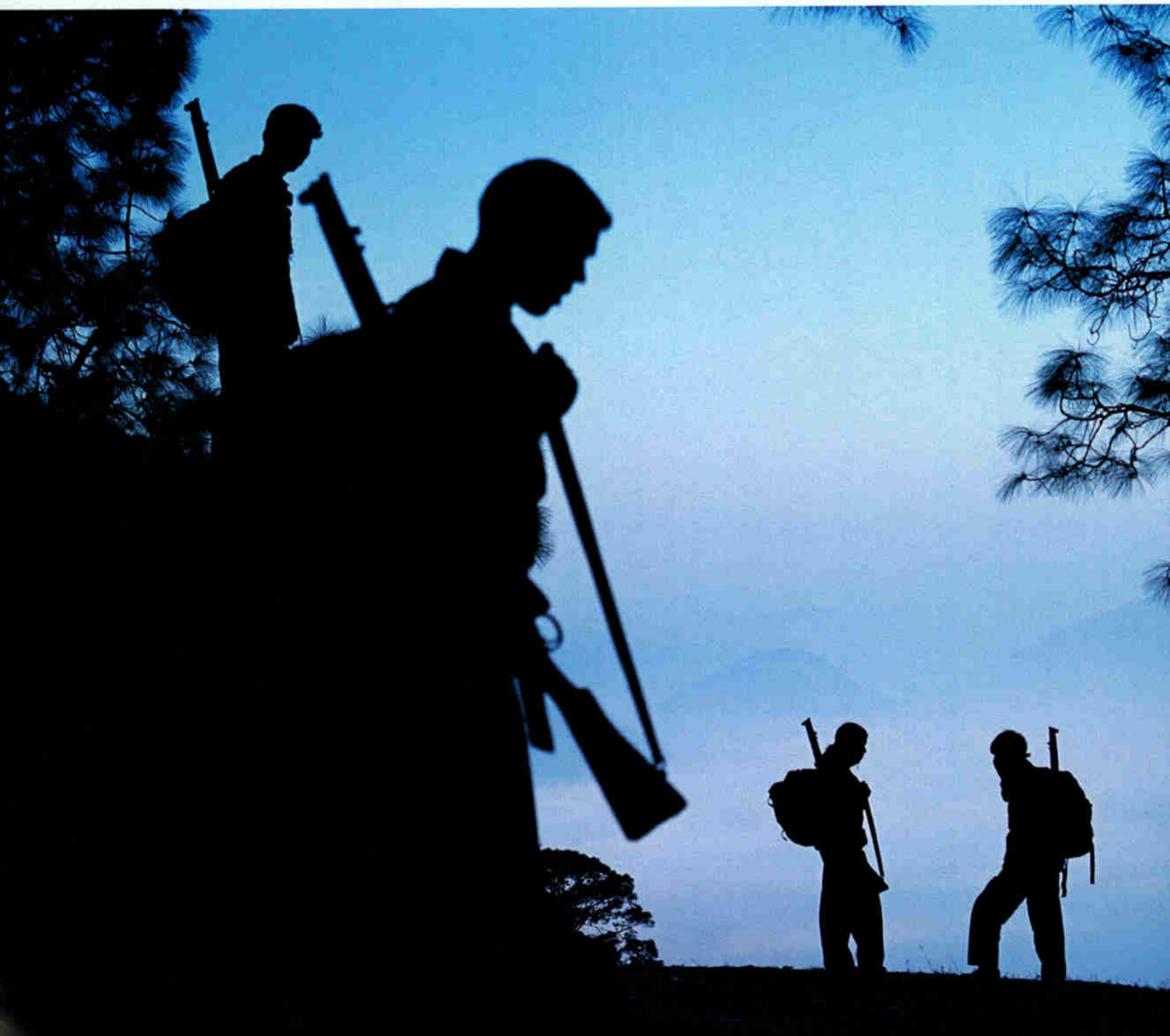
which estimates that 418 Nepalis disappeared in the year following the breakdown of the last cease-fire in August 2003. More recently, secret detentions continue, and killings are on the rise.

Soon after we reach Turmakhad, a group of rebels, including Ranju, arrives under the command of Comrade Bijay. Born in a village in Kalikot, Bijay had joined the Maoists when they were only a ragtag band of a few hundred. Now he's vice commander of the 31st Battalion and veteran of a dozen encounters with government forces. "We started with sticks and muskets," he says. "We took on the police, and then the army. Nobody thought we could succeed. But we have."

Rebels may control the high ground near Turmakhad, but Maoist domination of all Nepal appears unlikely. A vicious military stalemate has taken hold, and for many Nepalis, peace is now the most revolutionary idea of all.

When I ask if he's ever been to Kathmandu, the ultimate goal of the insurrection, a slow smile spreads across his face. "Not yet."

Each soldier in Bijay's unit receives a small allowance and clothing, like Chinese sneakers bought in bulk in government-controlled towns. Their guns have been captured from government forces: British .303s, some pre-World War I, but all in perfect working order. "My job," Bijay says, "is to kill a soldier, grab his weapon, and use it against others. India has just given Nepal 20,000 rifles. Soon they will be with me." More modern weapons, including M16s and heavy machine guns, are shared out for attacks. I saw no instances of Maoists using arms acquired outside Nepal.



The longer we spend with Bijay and his troops, the more I wonder what would happen to their enthusiasm and commitment if they realized that instead of launching an economic transformation, the People's War has sent Nepal's rural economy lurching into reverse. Swept up in the excitement of a big enterprise, many of the young rebels seem incapable of seeing the terrible impact of their insurgency—or of imagining any other way to make things better.

A few days later, as our trek is drawing to a close, we follow Bijay and his troops out of Turmakhad on a four-day walk north to the stronghold of Ramarosan. The Maoists are planning yet another rally, part of the same propaganda campaign we saw in Babiyachour. Each village we pass seems more impoverished than the last. At Kamal Bazar, I walk across a new airstrip finished just before the Maoists arrived. No commercial flights have ever landed here. The village school has closed, and many young people have fled to avoid being drafted by the rebels. The health post has run out of even the most basic supplies, including rehydration salts—this in a country where at least 13,000 children a year die from diarrhea.

Swept up in the excitement of a big enterprise, many young rebels seem incapable of seeing the terrible impact of the insurgency.

Outside Ramarosan, we stop for lunch at a farm where we watch hundreds of Nepalis on their way to the rally. I notice an old man and his son looking anxiously toward us. One of our minders says they want to talk.

The young man softly tells us his name is Krishna, and he's walked three hours to meet us because he thought we might be human rights workers. A year before, Krishna was herding sheep with a friend when they were caught in a rain shower. Sheltering in a cave, they found a strange metal object with fins and decided to hit it with a sickle. The mortar round exploded, killing his friend and nearly severing Krishna's arm.

Krishna lifts up his shirt and trouser legs to show the shrapnel still in his body. Livid scars run the length of his torso, and the stump of his right hand is raw from infection. He seems gentle and intelligent, but as bewildered as the rest of Nepal at the turn life has taken here.

Around me, I sense our Maoist guides growing uncomfortable. They say they never use mortars, that the shell was a misfire left by the RNA. I ask Krishna what he wants for the future. Our interpreter translates: "He says he wants to study. He says he wants peace. He says everybody here wants peace." □

ON THE REBEL TRAIL "At least a third of the Maoists are young women," says photographer Jonas Bendiksen. "They're some of the fiercest fighters." Listen to Bendiksen in Sights & Sounds at **ngm.com/0511**.

Rare Close-up

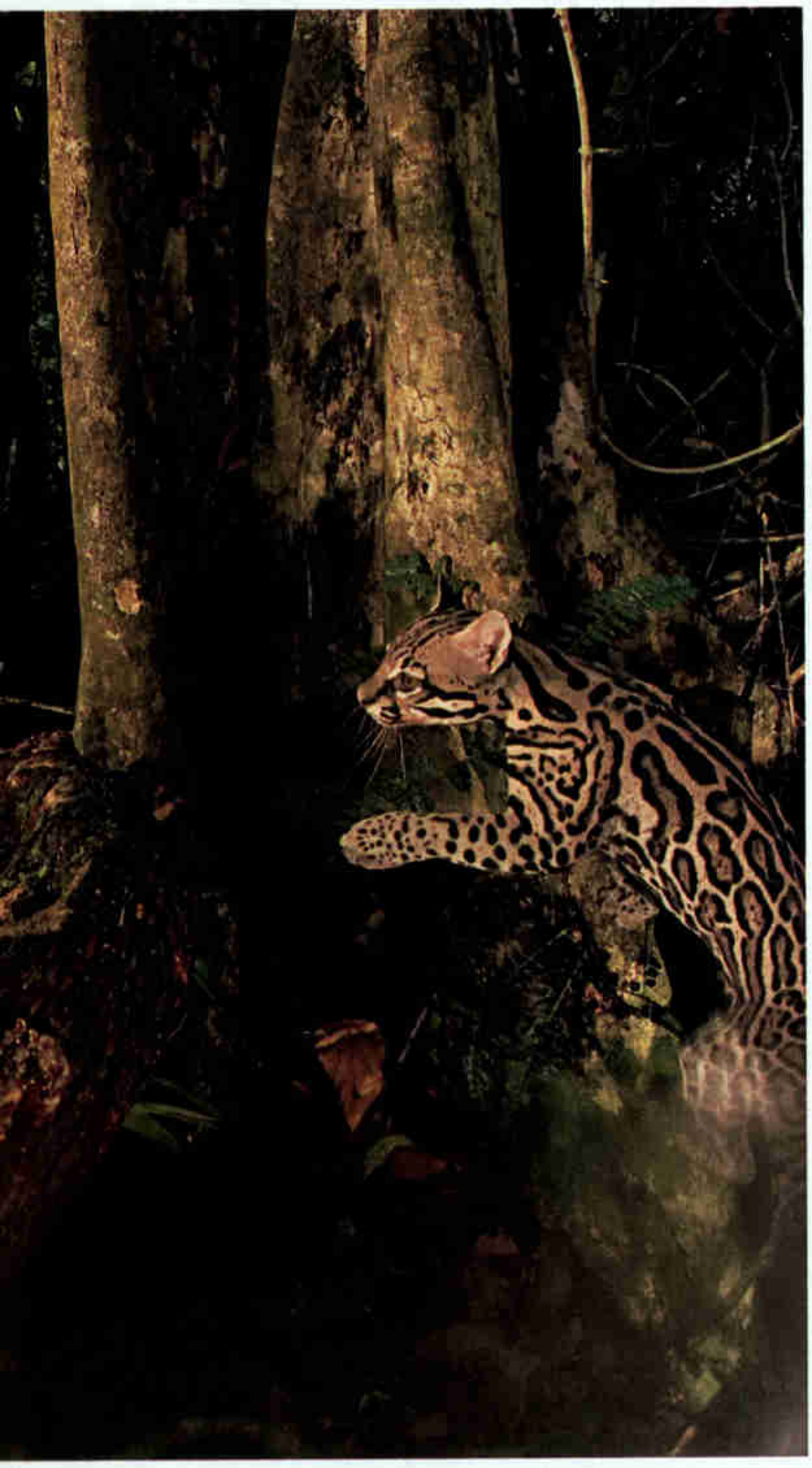
A radio-collared female ocelot, her ear torn from battles, trips an unmanned camera that captures this unusually close view of an ocelot in the wild. By using radio-telemetry to track the elusive cats in Panama, scientists are discovering how ocelots live in tropical forests.

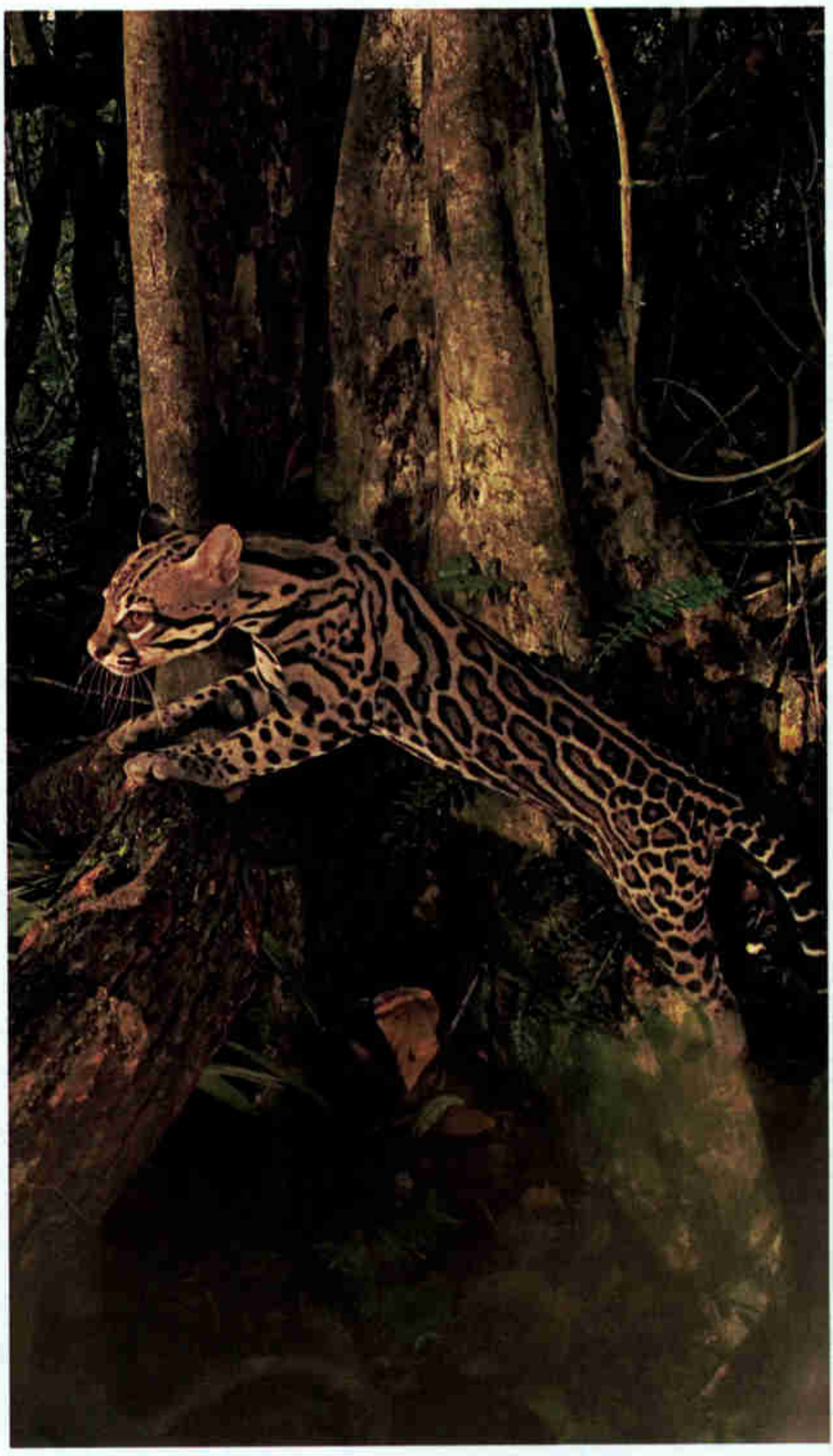
Following the Stealth Hunter

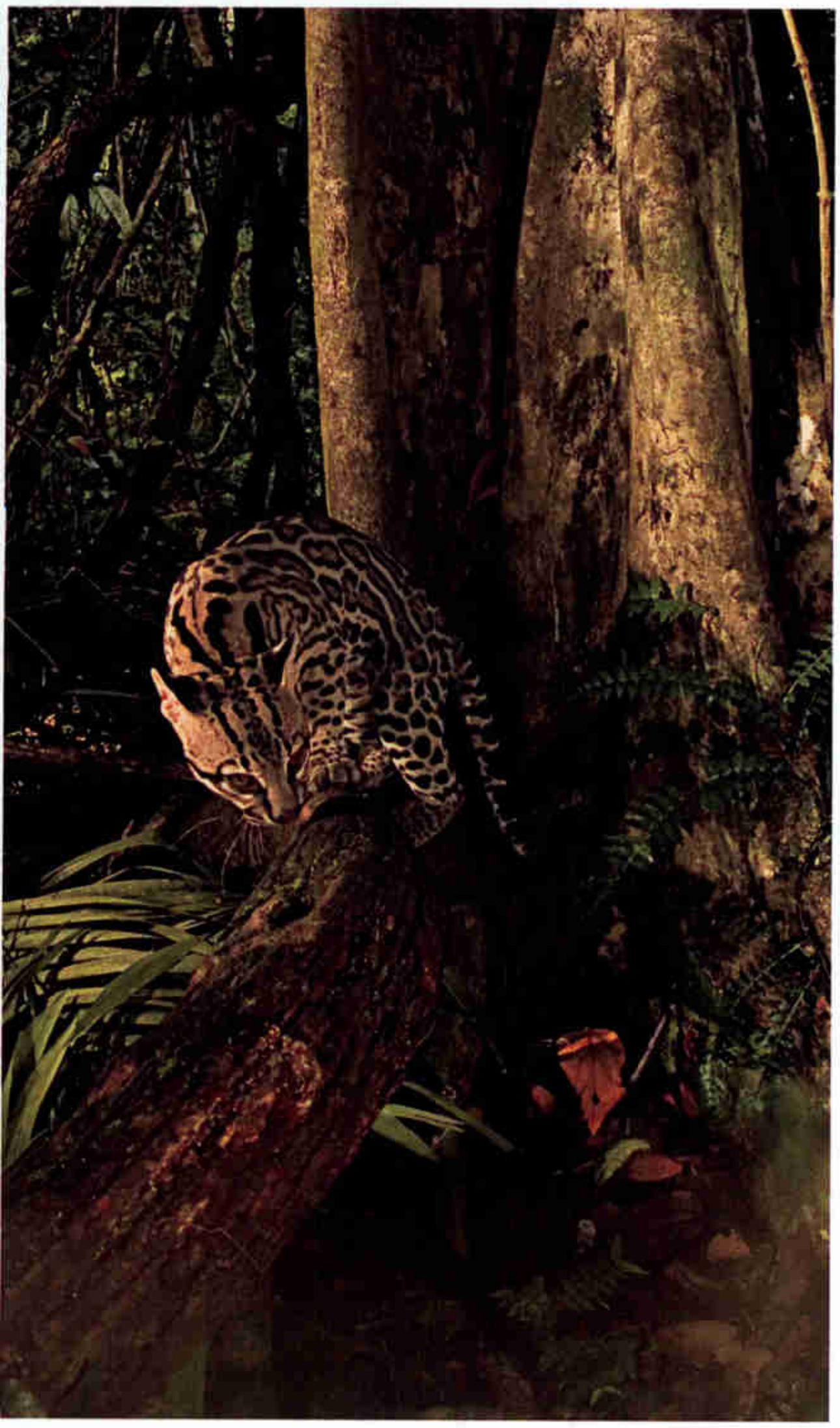
Six months on the trail of ocelots yields just six quick sightings. Why are these shy predators so tough to spot?

By Chris Carroll NATIONAL GEOGRAPHIC WRITER
Photographs by Christian Ziegler









Ghost in the Trees

Point A to point B becomes a flowing, slinky ballet as a young ocelot ascends from the forest floor onto a fallen log, then gathers herself for the next step. "They don't seem to touch the ground when they move," says photographer Christian Ziegler, who spent six months trying to make images of ocelots on Barro Colorado Island (BCI) in Panama, home to about 25 of these predators. Often his cameras caught sight of the cats even when he didn't: Ziegler made this series, and several other images in the article, with a digital camera triggered when the cat passed through an infrared beam.

Ocelots are territorial hunters that tend to follow familiar paths through the forest. A biologist by training, Ziegler followed tracks and observed scratch marks to find this fallen log, a likely sheltering place for small animals such as rodents, iguanas, and ground-dwelling birds that ocelots commonly prey on. The cats, which average 20 to 35 pounds, also take on bigger fare from time to time: Scientists have observed them eating sloths and howler monkeys, and have evidence that the largest ocelot yet found on the island—which tops 40 pounds—has even taken deer.

Cool Cat

Alert but calm, a caged female waits to be released by scientists. Humans weren't always so benign: Hunters killed more than 100,000 ocelots a year before trade in their highly coveted fur was banned in 1973. Though illegal hunting is still a problem, as many as three million now live throughout tropical and subtropical latitudes of the Americas.



It's the end of the dry season in Panama, and the jungle is parched. On a forest floor thickly littered with dead leaves, photographer Christian Ziegler stands perfectly still, listening intently to the beeping of the radio-tracking device his assistant is operating.

Nearby, perhaps only 30 feet away, an ocelot is on the move, according to the receiver's constantly shifting pattern of beeps. Yet despite the crackling ground cover and the fact that this feline predator can be as large as a medium-size dog, Ziegler can't see it or hear its steps. His human senses have been foiled by the cat, whose spotted coat helps it blend into the dappled light of the forest. The receiver gradually goes quiet as the ocelot departs, unseen and unheard.

Ziegler later comments, with mixed frustration and awe, "In six months I probably saw them with my own eyes only six times—usually for a split second as they flitted away."

The stealth of this species *(Leopardus pardalis)* and the heavy forest cover in which it often lives—its range spanning the Americas from south of the Amazon Basin north to the Rio Grande Valley of Texas—make it tough on scientists trying to observe ocelots in the wild.

"You can't sit in the Land Rover with binoculars like you're watching a lion stalk on a savanna," says Roland Kays, curator of mammals at the New York State Museum. He is studying interactions between the ocelots of Panama's Barro Colorado Island (BCI) and the cat's favorite prey—a seven-pound rodent called the agouti.

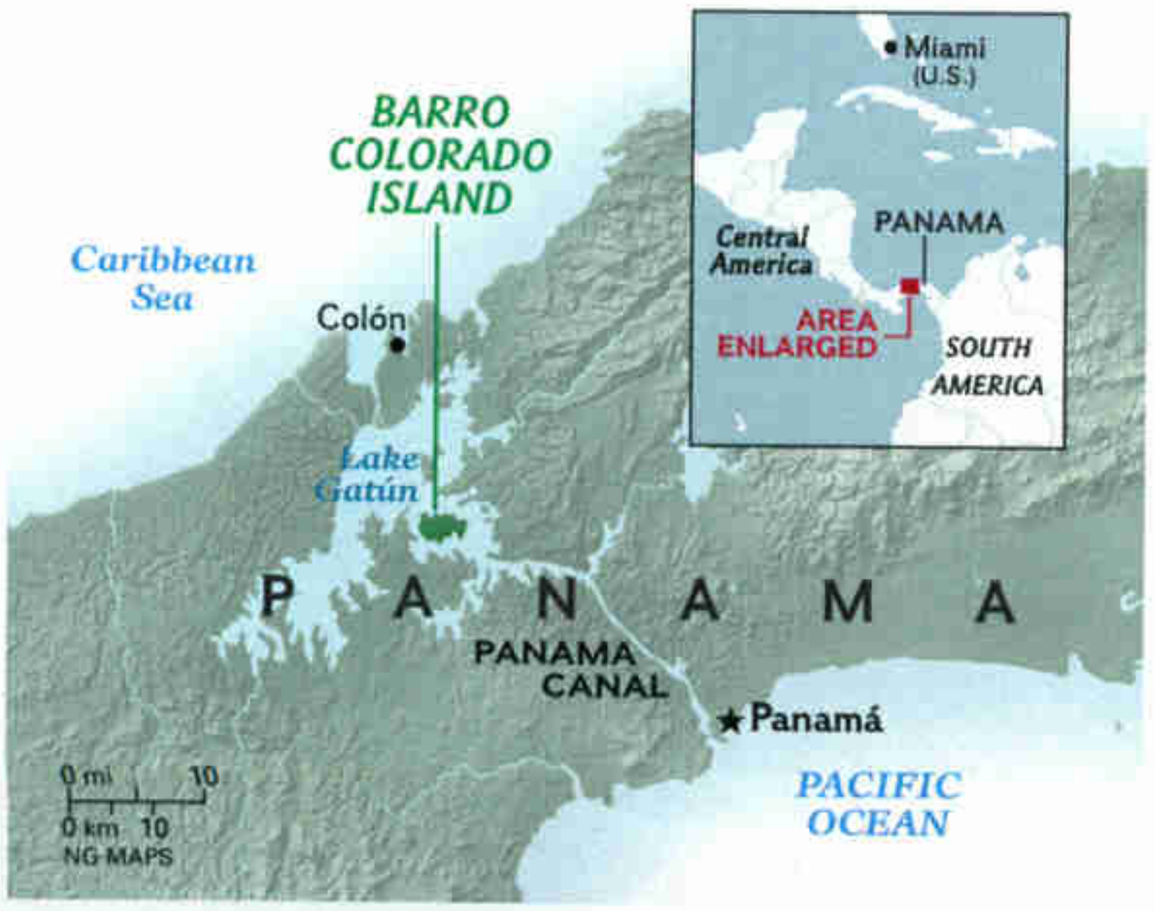
Here on BCI, Kays and Martin Wikelski of Princeton University are testing a groundbreaking animal-tracking system called the Automated Radio Telemetry System, or ARTS. With funding from the Levinson Family Foundation and the National Science Foundation, the system was installed by the Smithsonian Tropical Research Institute, which has run a research station on BCI for 82 years. Ocelots and agoutis were the first species to put ARTS through its paces.

Traditional wildlife radiotelemetry requires several researchers to scramble about with receivers to triangulate the position of an animal that had previously been trapped and collared with a transmitter. In contrast, ARTS consists of seven permanent radio towers positioned across the island. They pick up and relay signals to computers that constantly monitor dozens of animals. "You can gather more data in one week than you can in years of traditional telemetry," says Kays.

If he wants to know the daily activity schedules of his subjects (as well as of other species the system now tracks, such as sloths, monkeys, and opossums), he can simply scan the computer. One program produces a graphic

SOCIETY GRANT

This Research Committee project is supported by your Society membership.



Science Island

Construction of the Panama Canal created Barro Colorado Island (above) in man-made Lake Gatún. Home of the Smithsonian Tropical Research Institute, BCI is famous among biologists as the most studied six square miles of tropical land on Earth—a lab of biodiversity with more than a thousand plant species and a hundred types of mammals. These populations aren't static: Some animals, including ocelots, can swim the narrow gap between BCI and the mainland.



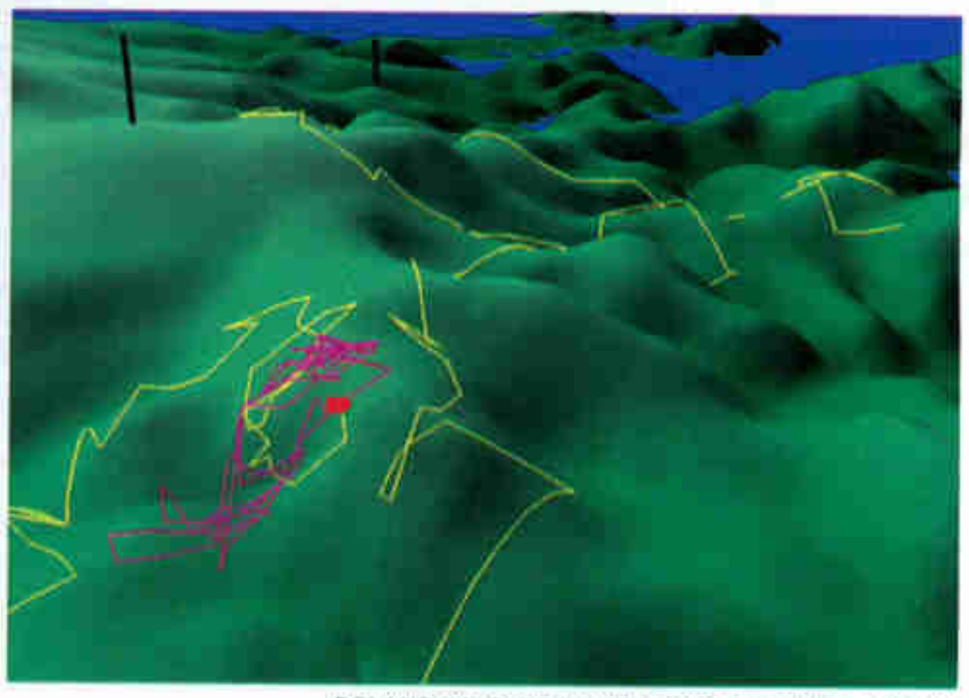
that shows when the animals are active. This allows researchers to keep track as ocelots rouse themselves, typically around 6 p.m., to go on a prowl that will likely continue until morning. ARTS also constantly maps the locations of the cats, which has helped scientists learn that the average home range of a male BCI ocelot is 1.4 square miles; for females, it's about 0.6 square miles. This spatial monitoring becomes especially exciting, and scientifically illuminating, in the rare case when two collared animals meet and interact.

Useful as it is, "technology can't replace fieldwork," Kays says. He and his colleagues also use traditional methods like collecting scat and searching for paw prints. Their goal: to learn more about the importance of predators to ecosystem health. For instance, if ocelots were to become extinct on BCI, unchecked rat or agouti populations that devour seeds could wipe out some plant species.

Ocelots do face threats from poaching and habitat destruction. But happily, now that hunting the cats is illegal in most of their range, there's little danger the 1.5 million to 3 million ocelots living in the Americas will disappear







ROLAND KAYS, NEW YORK STATE MUSEUM, ALBANY

Death of an Agouti

Biologist Roland Kays prepares to fit a trapped ocelot with a radio collar (facing page). He and his students have also collared many an agouti, a tropical rodent (top), here eating a spiny palm fruit. Only on BCI could the researchers do what comes next: monitor the animals' erratic trails for nine hours (above)—the ocelot's path in gold, the agouti's in purple.

Automated tracking of multiple animals is possible because receiver towers dot the island—the only system of its kind. "You can't get this type of continuous data chasing animals through the forest with receivers," Kays says.

The ocelot circles and finally makes a kill, shown as a red square. Seeds the agouti had buried to eat later will now have the chance to grow into trees—an example of how a hungry ocelot's nighttime hunt can affect a whole ecosystem.

anytime soon. In many parts of the tropics, hunting has decimated populations of jaguars and pumas, the Western Hemisphere's largest feline predators, raising ocelots' status a notch in the ecosystem—big shoes to fill for the forest cats.

"They may now be the dominant predators in many areas across the tropics," Kays says. "To what extent can they play the balancing role of large predators? This is a question we want to answer."

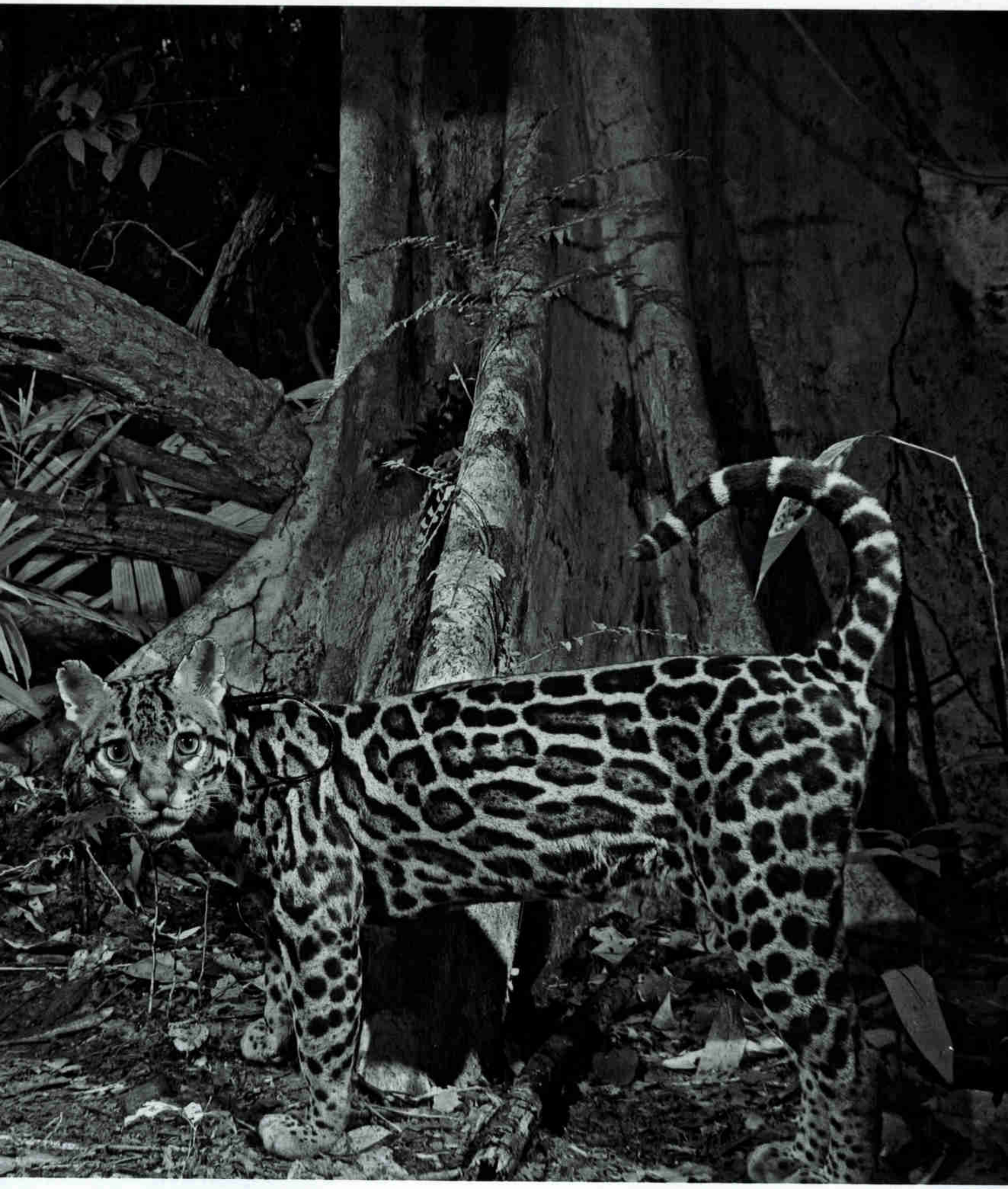
QUICK AS A CAT See video of ocelots on the move and watch them being radio collared. Then discover how Christian Ziegler shot pictures in the dark—without a flash—at **ngm.com/0511**.

Night Vision

On the prowl through a darkened jungle, a female ocelot hears a faint click and comes to attention, her powerful eyes scanning the night for the source of the sound. If it's prey, she's set to pounce. If it's a puma—a much larger predator that also hunts on Barro Colorado—she'll flee for her life. This time, the sound is the shutter of a digital camera specially modified for this project to shoot black-and-white infrared images in pitch blackness. Digital infrared imaging will be the future of nocturnal wildlife photography, Ziegler predicts. "The animals don't know they're being photographed," he says. "It isn't intrusive at all."

With no bright flash to spook this cat, she continues on her way, undisturbed. □





WAR LETTERS

THE LIVES BEHIND THE LINES

Grief is a very selfish, lonely thing. Nobody teaches us how to do it properly. So we just have to make up the rules as we go along . . . some days are OK, some are bad, and sometimes they're just awful. But we learn to go on. I've had to redefine "normal." Normal will never be the same.

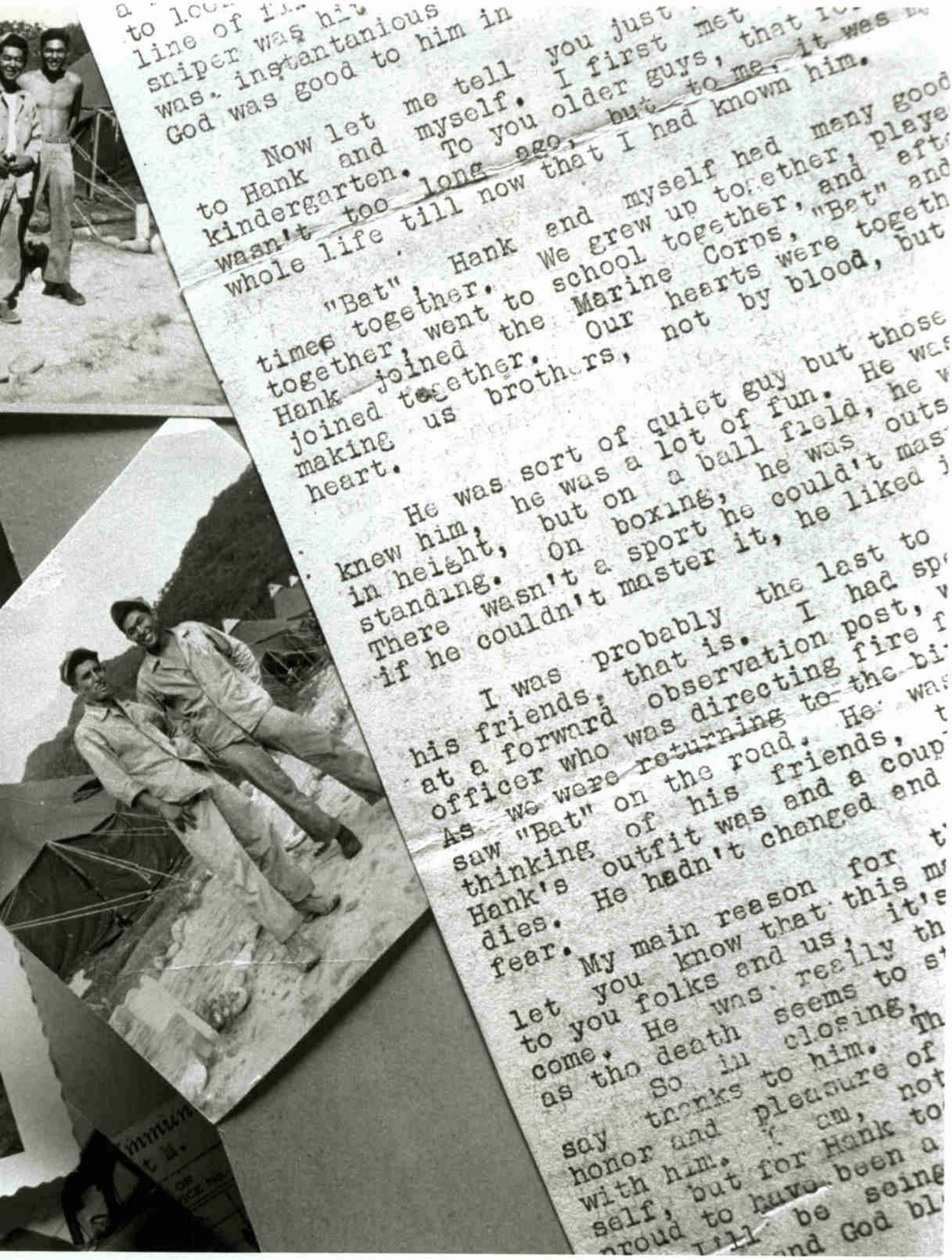
—Gloria Caldas, to her son's fiancée

THE WAR IN IRAQ

Gloria Caldas dreams about her son, Ernie (in photo at left), who was killed by a roadside bomb in Iraq. "The dreams are so vivid," she says. "His voice is crystal clear. He tells me that he's OK." Ernie's voice is also preserved in dozens of e-mails he sent her, the last discussing his upcoming wedding. For generations, wartime letters passed between those on the front lines and loved ones back home have often provided the clearest views of armed conflict. Whether scribbled in a foxhole or composed at a kitchen counter, each serves as a reminder of the mark war leaves on every human swept into its path.



Sons of immigrants and best friends since kindergarten, Robert Wada (top) and Robert "Bat" Madrid (left) joined the Marines in 1950 as the Korean War began. "We thought we were bullet-proof," says Wada, now age 75. Separated after boot camp, the friends would cross paths twice in



Korea—once in the field, where they posed for snapshots, and weeks later on the front, hours before Madrid was killed. Since Wada never got one of Madrid's official Marine portraits, he combined one of his own with his friend's high school yearbook photo to create the image at left.



I loved him like my own brother

and I never let him leave my heart . . . I think of him every day and still cannot believe he is gone . . . Goddamn, Rudy, we are leaving the ground we just took, the hill "Bat" was killed on and everything.

—Robert Wada, to his friend's brother, Rudy

THE KOREAN WAR

Bob Wada (above) regularly visits Bat's grave (right) in Redlands, California, where the two grew up riding bicycles and hunting rabbits among the orange groves. "Bat and I used to ride up here to the cemetery at midnight to test our courage," remembers Wada. "I've always felt guilty that I asked him to join the Marines with me. I still don't understand why he died and I lived. I figure God had a reason."

By ANDREW CARROLL
Photographs by MAGGIE STEBER

"WHY LETTERS?" a young Iraqi man named Ammar asked when I told him I was traveling the world in search of wartime correspondence.

We met while I was waiting for a ride to the Baghdad airport, and somewhat rushed, I replied that letters written by those who have experienced war firsthand describe it with unrivaled intensity and intimacy.

Ammar was not convinced. "My brother fought against the Americans in 1991," he said. "He sent letters home, but no Iraqi soldiers could say how they truly felt. I am not sure how such letters could be of much value to you."

While we were talking, my military escort arrived, and I had to cut our conversation short. As I stared out the open window of the Humvee, I thought of the longer reply I wish I could have given Ammar. I wanted him to know that I had launched an effort to preserve war letters, the Legacy Project, after a fire destroyed our family home in Washington, D.C., in 1989. Nothing was more devastating than losing all our personal correspondence, and it inspired in me a greater appreciation for letters and a desire to save them for posterity.

After a "Dear Abby" newspaper column announced the creation of the project nine years later, I was inundated with tens of thousands of American letters, including originals dating back to the Civil War. Yellowed with age, and often bundled together with frayed ribbons, many were fragile and required great care. It seemed impossible that these delicate pieces of paper could convey the fury and bloodshed of warfare.

But in countless letters, especially those written hastily in foxholes, trenches, and the bellies of warships, the faded words would suddenly flicker to life and describe a moment in time with breathless urgency. "Dear Sis: It is now 9:05 Sunday morning and we've been bombed now for over an hour," a sailor named William Czako wrote on December 7, 1941, from inside the U.S.S. *New Orleans*. "We were just struck by a bomb near the bow. . . . I can hear the various stations screaming orders at one another. A man just brought us our gas masks." Letters like this represent the first, irreplaceable drafts of history —immediate, raw, unfiltered.

For years I traveled throughout the U.S. speaking with veterans, and time after time I heard the same appeal: Expand the project. Seek out letters by veterans from different nations. At the very least, they said, foreign war letters would offer a fresh perspective on familiar battles and historic events.

Before embarking on my global search, anti-American protests flared up around the world because of the war in Iraq. I braced myself for the possibility that in such a contentious atmosphere few people would be willing to assist me, and I would return empty-handed.

The response, in fact, was overwhelming. In every country people could not have been more hospitable or generous. Veterans shared letters they had not shown to their own families in years—if at all. Archivists spent days sifting through stacks of correspondence deep within



SEVERAL OF THE LETTERS SELECTED HERE ARE FEATURED IN ANDREW CARROLL'S *BEHIND THE LINES* (2005). REPRINTED BY PERMISSION OF SCRIBNER, AN IMPRINT OF SIMON & SCHUSTER, INC.

their collections to find previously unpublished material. And my indefatigable guides scoured antique shops with me to salvage letters that might eventually have been thrown away.

The letters were breathtaking. We uncovered riveting accounts of the fighting at Verdun, Leningrad, Berlin, Pusan, Saigon, Sarajevo, and many other cities whose names are now synonymous with ferocious battles and sieges.

What makes the letters so powerful is not only the history they record but also the common humanity they reveal. The homesickness felt by Civil War soldiers who thanked their sweethearts for sending them "likenesses" (their word for photographs) was echoed in the letter from Michael Kaiser, a German peacekeeper who served in the Balkans in 2000. The anguish felt by a Hungarian mother named Anna Koppich who had lost her son in World War II was as unbearable as the despair experienced by an American woman, Gloria Caldas, after her son, Ernie, was killed in Iraq in 2003. The depth of conviction articulated by a young Jewish soldier named Joseph Portnoy in 1945 was as heartfelt as the faith of Muslim Turkish troops at the battle for Gallipoli. And when I met Chuck Theusch, who corresponds with Vietnamese veterans, I thought of the British and German soldiers who spontaneously stopped fighting on Christmas Eve 1914. Theusch and the Vietnamese now build libraries together in the country where they once faced each other in battle.

Erase the names, dates, and geographical references in these letters, and it would be difficult, if not impossible, to determine the nationalities of the writers. Their words transcend boundaries, offering insights that are timeless and universal. They reflect the full range of emotions, made more vibrant and poignant through the prism of warfare. Both a warning and an inspiration, the letters remind us of our capacity for violence—and of our potential for compassion. They're a searing reminder as well of the profound and often lasting effects of war on every individual caught in its grasp.

Perhaps what struck me the most was that many of these letters were written at all. Some are private admissions of fear or loneliness. Others are graphic descriptions of combat that evaded the censors. A British prisoner of war named Clifton Johnson-Hill even risked his life to write a series of short messages to his wife while he was held captive by the Japanese during World War II. Had he been found with the letters, which detailed the brutality of prison life, he could have been tortured or executed. Such letters are a testament to the desire among those directly affected by war to ensure that the sacrifices it imposes, and the trauma it inflicts on troops and civilians alike, are never forgotten.

Several months after I spoke with Ammar, a Kuwaiti scholar showed me a letter written by a soldier to his mother during the gulf war. "I've never forgotten your face. . . . How much have you suffered and are still suffering for years. Please have mercy on me. . . . Had it been in your hands you would have taken me out of hell." The soldier was an Iraqi, and the letter, found on his body, was his last message home.





Ask God to give you what you want. Help him to justify your wants by the way that you live, and then having given him your prayer, have the faith and courage to rely on his power to do the thing that is right in his eyes. *—Joseph Portnoy, to his wife, Ruthy*

WORLD WAR TWO

After 15 months of patching up wounded men on Europe's battlefields, Joe Portnoy came home to his beloved wife, Ruthy (left, in photo), packed away his Army uniform and Bronze Star, and embarked on a 40-year career as a Jewish cantor, leading synagogues in prayer and song. God had little to do with the war, he wrote to Ruthy. "Wars will go on as long as men's hearts are as they are."

We used the bayonet and the kukri, and the bullets flew

WORLD WAR ONE

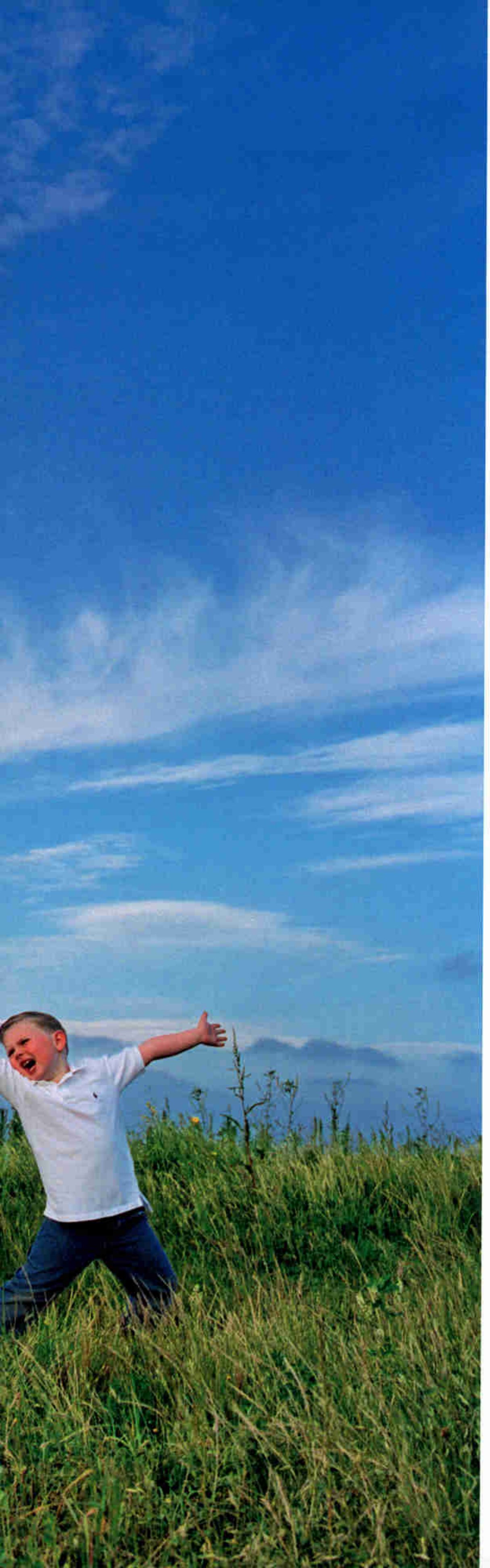
A cadet from the Royal Netherlands Air Force Academy reads some of the 54,896 names carved in the stone facade of the Menin Gate. Erected on the road leading to Ypres, Belgium, the scene of savage fighting—including the war's first poison gas attack—the gate stands as a monument to British Commonwealth soldiers, including many from India and Africa, who have no known graves. More than 700,000 men were killed or wounded in the struggle that raged intermittently from 1914 to 1917 for this swath of farmland, the last sliver of unoccupied Belgium.



about more thickly than drops of rain . . . in some places men had lost their eyes, in others men without legs, but what could one do, as is in one's fate so it will happen. Such is the scene and one was powerless. Now I have not any sure confidence that I will see you people again, there is nothing but hopelessness.

—A wounded Indian rifleman in a hospital, April 1915





Happy Valentine's Day!

. . . Thank you for keeping all of us servicemen and women in your thoughts and prayers. We really appreciate the support; it does make a difference over here. . . . My unit has not seen any action yet, but according to everything I have heard on the news, a ground offensive is necessary. In the meantime, the aviators continue with their bombing, which is fine with me. Not knowing how you will react to this candid discussion on my part makes me a bit nervous. . . . Hopefully, you will tell me what you think in your next letter. . . . If you care to write me back, I would like to hear from you. . . .

—Steve Belgum, to Lynda Severson

PERSIAN GULF WAR

In 1990 Lynda Severson sent Christmas gifts to Marines serving in the Persian Gulf war. Capt. Steve Belgum wrote a thank-you note, and a romance blossomed. The couple married in 1993 and today live with their two sons in California. Still in the reserves, Steve was called to serve stateside in the buildup for the Iraq war and could be called to duty again, perhaps overseas. But wherever he goes, he carries a special message from Lynda engraved inside his wedding ring: "pen pals forever."



For the first time in my adult life I'm not torn between two

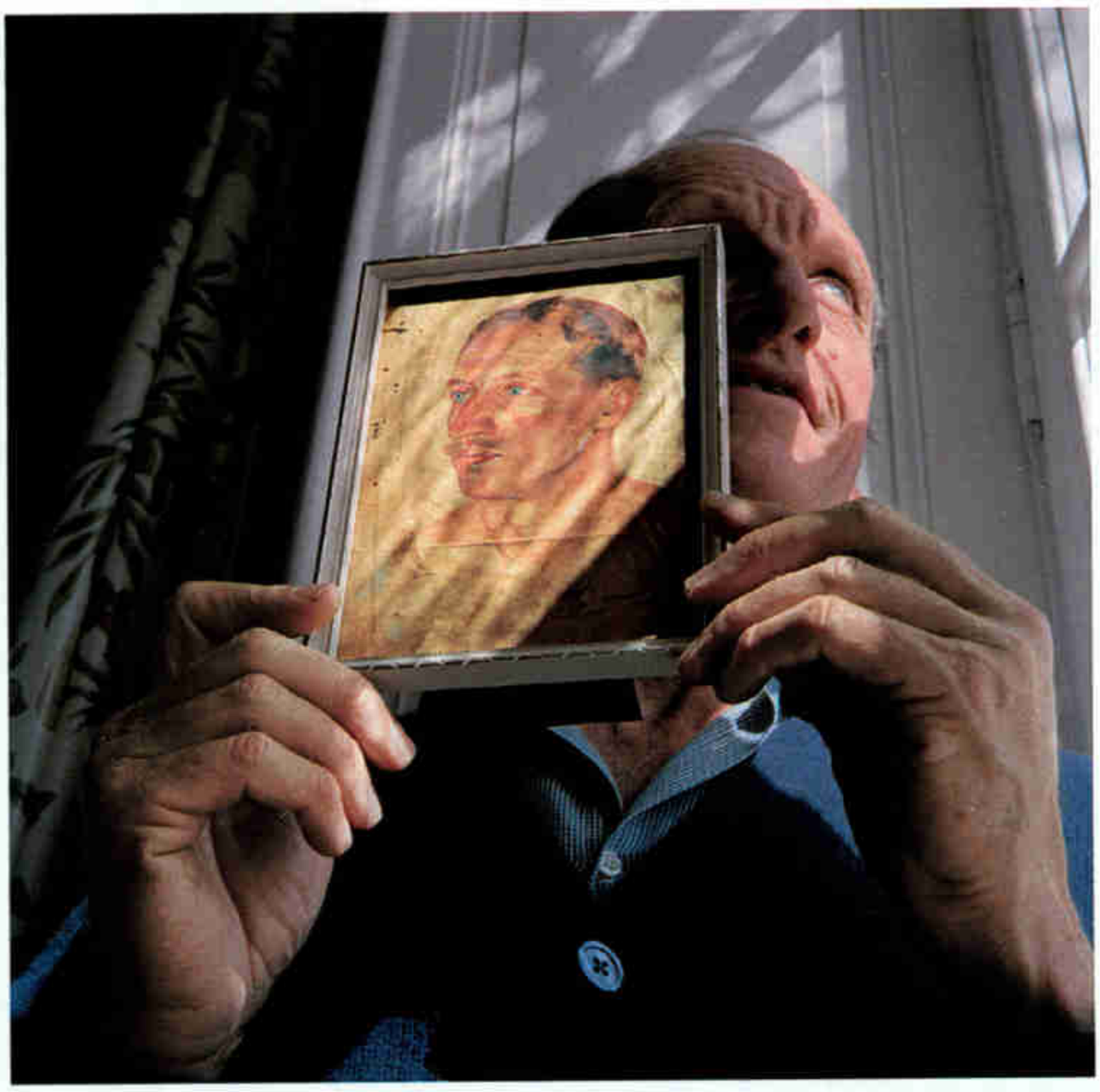


WAR IN AFGHANISTAN

Childhood photos of Masuda Anna Mohamadi and her father remind her of peaceful times in Afghanistan. In 1979 she and her family fled the Soviet invasion and settled in the U.S., but Masuda and her father returned in 2002 to help rebuild their shattered nation. From Kabul she e-mailed friends about reunions with lost relatives and her work as a teacher. "It was like a huge wound had healed in my heart," she says. Tragically, her father died in a plane crash while there.

cultures. I don't have to struggle between being Afghan and American. I am an Afghan living in Afghanistan. I can't even describe how comforting this feels. I believe I have been searching for this sense of belonging since we left Afghanistan 23 years ago.

—Masuda Anna Mohamadi, to friends



Well, darlingest one, I can't possibly tell you what a relief it was to know our child was born alive and that you must have recovered from it sufficiently to have him christened Alan, a name I like immensely. . . . I am simply dying to get your first letter to hear all the details. As you can imagine what a hell it is to be a prisoner of war under Japanese hands, not even allowed to know the sex of one's child until he is over 14 months old. . . . Oh for your letter, Beloved. *—Clifton Johnson-Hill, to his wife*

[WORLD WAR TWO

Alan Johnson-Hill holds a portrait of his father, Clifton, painted with homemade dyes by a fellow POW in a Japanese camp. Captured defending Singapore in 1942, the Englishman endured hunger, disease, and backbreaking days building the Thai-Burma Railroad. He also risked torture for keeping a secret diary, written in the form of letters to his wife, who had escaped to Australia while pregnant with Alan. Since the Japanese destroyed most of the incoming mail, Clifton learned of Alan's birth from another prisoner. Father and son first met after the war when Alan was four.

WAR IN KOSOVO

A drawing of a nude woman transports Michael Kaiser from his Nuremberg apartment back to Kosovo and the armored vehicle he shared with 30 other German peacekeepers in 1999. "We were there to collect evidence of mass killings and rape," he says. Taped inside their armored vehicle, the self-portrait sent by Kaiser's girlfriend back home became for him and his men a symbol "of normal women, without destroyed souls."

Our thoughts drifted toward another world. . . . Thus the picture from far away Nuremberg provided us with a few hours which the members of this illustrious crew will never forget.

—Michael Kaiser, to his girlfriend







Each trip to Vietnam

I feel depths of sadness over the darkness of the past, but then in the children I find the joy and hope for the future. Maybe it is why I need Vietnamese children in my life so much—they beam with bright light of better tomorrows for all of us.

—Chuck Theusch, to a Vietnamese friend

THE VIETNAM WAR

Blind children "see" Chuck Theusch for the first time. In 1970, as an 18-year-old U.S. infantry private, Theusch fired mortars into Vietnam's central highlands. Now he builds libraries there, including one at the school for the blind in Bac Giang. To get government approval for his projects, Theusch works closely with men he was once trying to kill—and who were trying to kill him. "After 30 years I think veterans of all wars start to see things differently," he says. "Now I just want to help the people as much as I can." □

IN THEIR VOICES Hear Gloria Caldas, Masuda Anna Mohamadi, and Joseph Portnoy read their letters in a multimedia special at **ngm.com/0511.** Then link to the Legacy Project's website at **warletters.com.**

STRANGE

TERRAIN

UNDERSEA ODDBALLS OF LEMBEH STRAIT



Up from the underworld, a snake eel pokes its three-inch-wide head out of the volcanic sands of Indonesia's Lembeh Strait to snag passing prey.

HIGH-FIN SNAKE EEL: *ORHICHTHUS ALTIPENNIS*

Fan away a shroud of sand, and a stargazer emerges like a death mask. The half-foot-long fish explodes vertically out of its lair, grabbing fish and invertebrates.

MARBLED STARGAZER, *URANOSCOPUS BICINCTUS*



TEXT AND PHOTOGRAPHS BY DAVID DOUBILET



Think of a coral reef as Las Vegas: a glowing city of sexy fish flitting down boulevards of neon corals. Then imagine an undersea neighborhood that's more like the gritty desert beyond Vegas, where you run into quirky characters like the guy running the one-pump gas station, or the bar where people wait for aliens. That's Indonesia's Lembeh Strait.

Lying off the northeast tip of the island of Sulawesi, sheltered from the open ocean, the strait is at first glance an unwelcoming moonscape—plains of silt and black and gray volcanic sands stretching into murky gloom. Some divers call it the muck. There are no grand vistas, no teeming corals. But any place you put your hand, there is life, veiled in the sand or hiding in plain sight. You have to look closely, for many things are not what they seem. I stared for minutes at a sea fan before finding pygmy seahorses the size of my thumbnail clinging to the branches (right), their skin matching the color and texture of the sea fan's polyps. Another night a rare visitor drifted into the cove of Kungkungan Bay, camouflaged in a floating mass of sargassum weed. As the seaweed slowly broke apart, a golden sargassum frogfish emerged in mirror image under the lights of a pier (above).

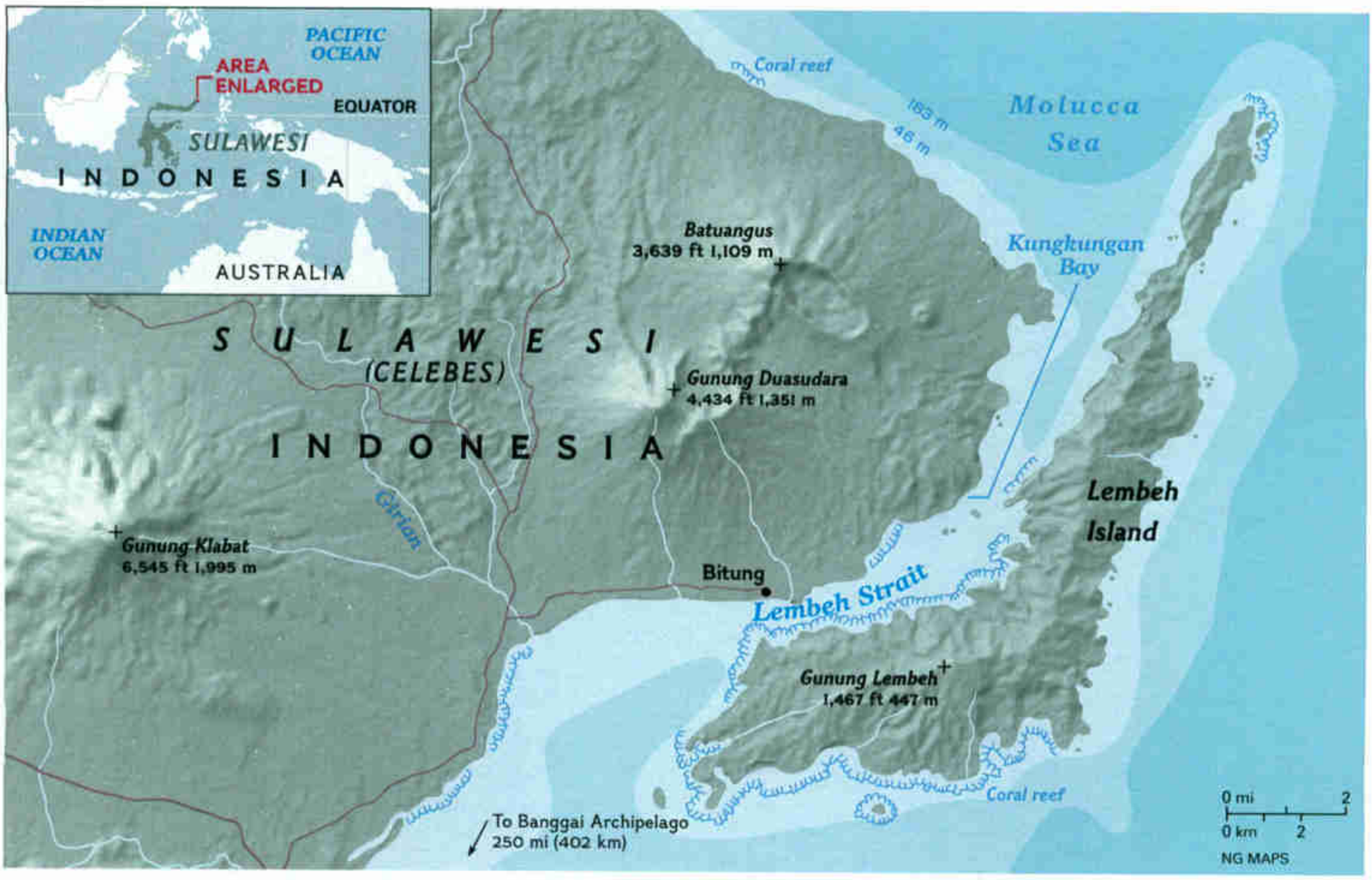
SARGASSUM FROGFISH: *HISTRIO HISTRIO;* PYGMY SEAHORSE: *HIPPOCAMPUS BARGIBANTI*

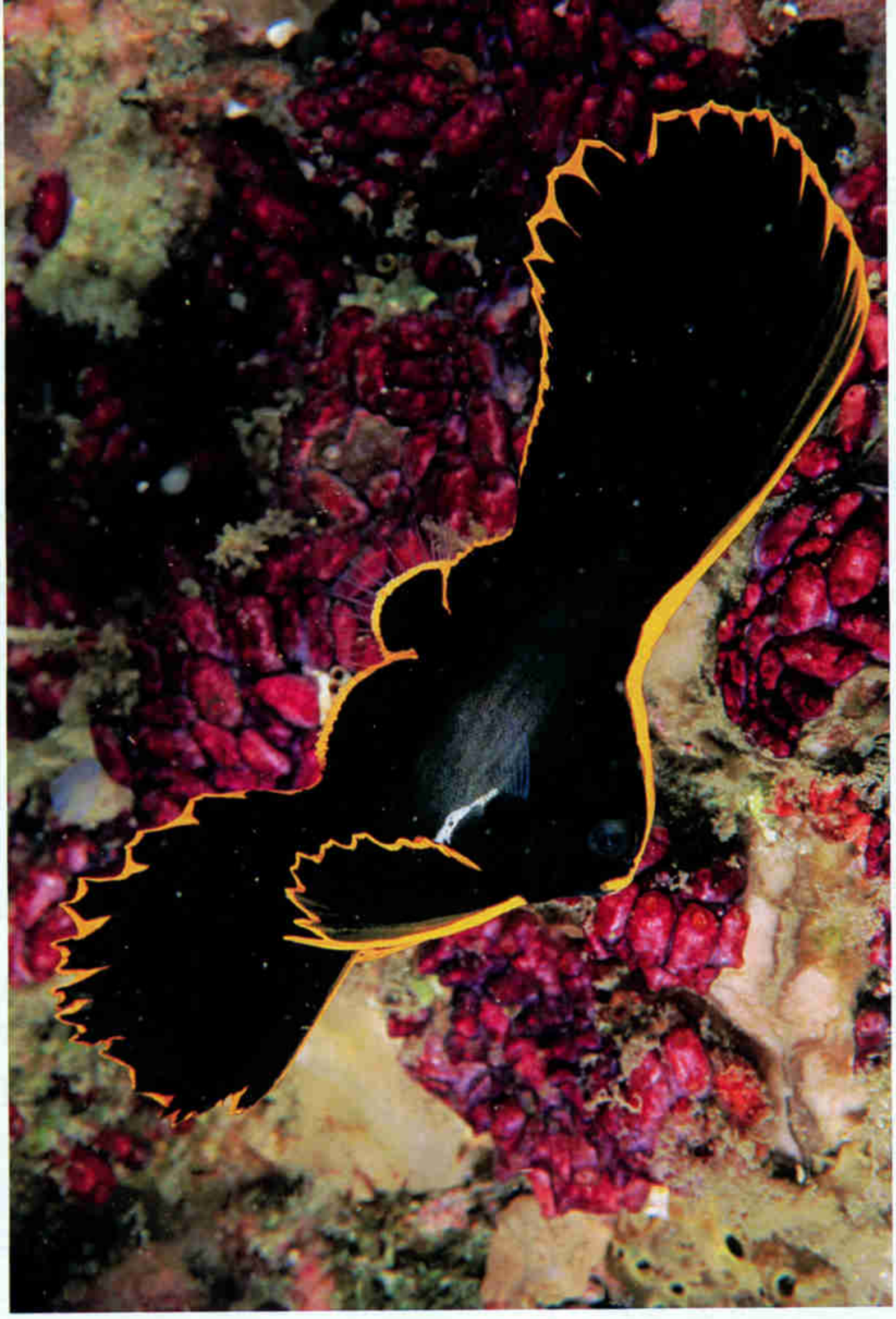


IN THE SHADOW OF VOLCANOES

At dusk the Lembeh Strait seems lit by fireflies as fishermen in outriggers use kerosene lanterns to attract baitfish for the tuna fishery far offshore. Sulawesi sits in the middle of the greatest concentration of coral reefs on the planet—a virtual coral Eden—so diving in Lembeh Strait can seem an ironic contrast. But this little-studied world between the reefs and the rain forests is also a rich environment. A deepwater upwelling in the Molucca Sea pushes a vital plankton broth south into the ten-mile-long strait, and rivers running down through Sulawesi's forests also add nutrients. Whale sharks and manta rays once cruised here, but they were fished out. With those attractions gone, divers and then scientists turned their attention to the bottom, and were astounded by the profusion of life. Yet the strait can't be called pristine. The port of Bitung has nearly 145,000 people, and the heavily traveled waters gather trash. Paradoxically, this has benefits: On the strait's otherwise featureless bottom, tires, bottles, cans, and old shoes all become some creature's habitat.




PACIFIC OCEAN
AREA ENLARGED
EQUATOR
SULAWESI
INDONESIA
INDIAN OCEAN
AUSTRALIA
Coral reef
183 m
46 m
Molucca Sea
Batuangus
3,639 ft 1,109 m
Kungkungan Bay
S U L A W E S I
(CELEBES)
Gunung Duasudara
4,434 ft 1,351 m
I N D O N E S I A
Lembeh Island
Gunung Klabat
6,545 ft 1,995 m
Girian
Bitung
Lembeh Strait
Gunung Lembeh
1,467 ft 447 m
Coral reef
To Banggai Archipelago
250 mi (402 km)
0 mi 2
0 km 2
NG MAPS



SURVIVAL STRATEGIES

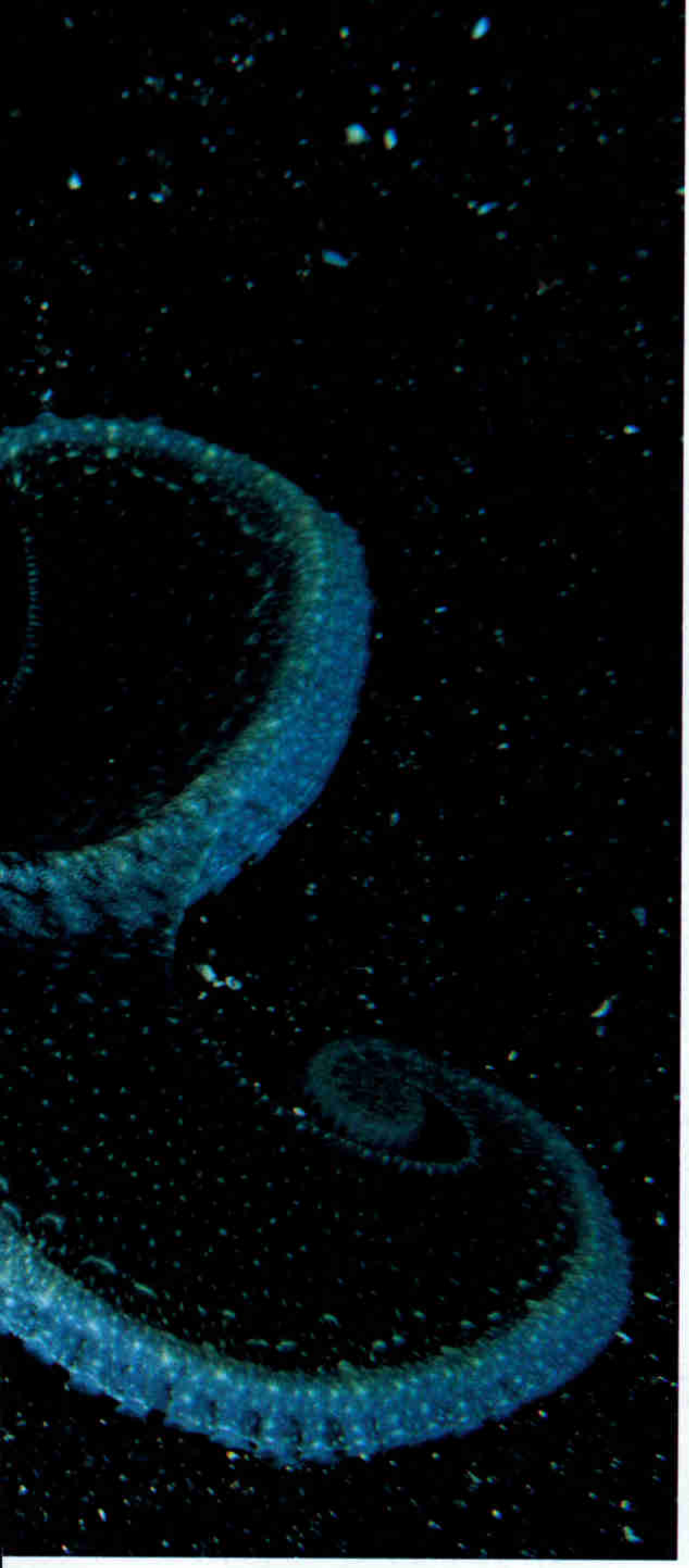
Fluttering like a butterfly in front of sponge-encrusted rock, a juvenile batfish (above) looks dangerously conspicuous—easy picking for predators. But the message it's sending is "Eat me and you will die." Its coal black body and vivid orange trim mimic the colors of a toxic flatworm. As adults, batfish turn silver with a few black stripes, far less flashy than Banggai cardinalfish (right, amid a beaded anemone).

Until five years ago these fish lived only around the Banggai Archipelago, 250 miles south of Lembeh. Then a few likely escaped into the strait from the holding pen of an aquarium-fish exporter, and their numbers exploded—an unplanned experiment biologists are monitoring. The newcomers find protection among the stinging tentacles of anemones or the spines of sea urchins.

PINNATE BATFISH: *PLATAX PINNATUS;* BANGGAI CARDINALFISH: *PTERAPOGON KAUDERNI*

SHOWTIME AT THE OCTOPLEX

More than 15 octopus species share the stage of Lembeh Strait, "and they all seem to want to perform," says marine biologist Christine Huffard. One species new to science (above)—called for now the brown mimic because of its baseline coloration and ability to change shape—spreads the webbing between its arms





in a bluff display of aggression, reaching the size of a dinner plate. Octopuses are master illusionists, deftly disappearing then reappearing in another spot. The aptly nicknamed wunderpus (top right) flows over the sand like quicksilver. First observed in the 1980s in other parts of the western Pacific, the wunderpus is only now being scientifically described and will be given its own genus. The coconut octopus (above) often finds shelter in coconut shells that wash into the strait. When out of the shell and on the move, it can travel bipedally, wrapping its six other arms around its body and walking backward.

BROWN MIMIC: *OCTOPUS* SP.; WUNDERPUS: OCTOPODIDAE; COCONUT OCTOPUS: *OCTOPUS MARGINATUS*

Cradling her brood, a mantis shrimp leaves a burrow to give her week-old eggs an oxygenating outing. Powerful, athletic predators, these crustaceans scan their world with complex stalk eyes that offer a nearly 360-degree view.

ODONTODACTYLUS SCYLLARUS









JAWS OF LIFE

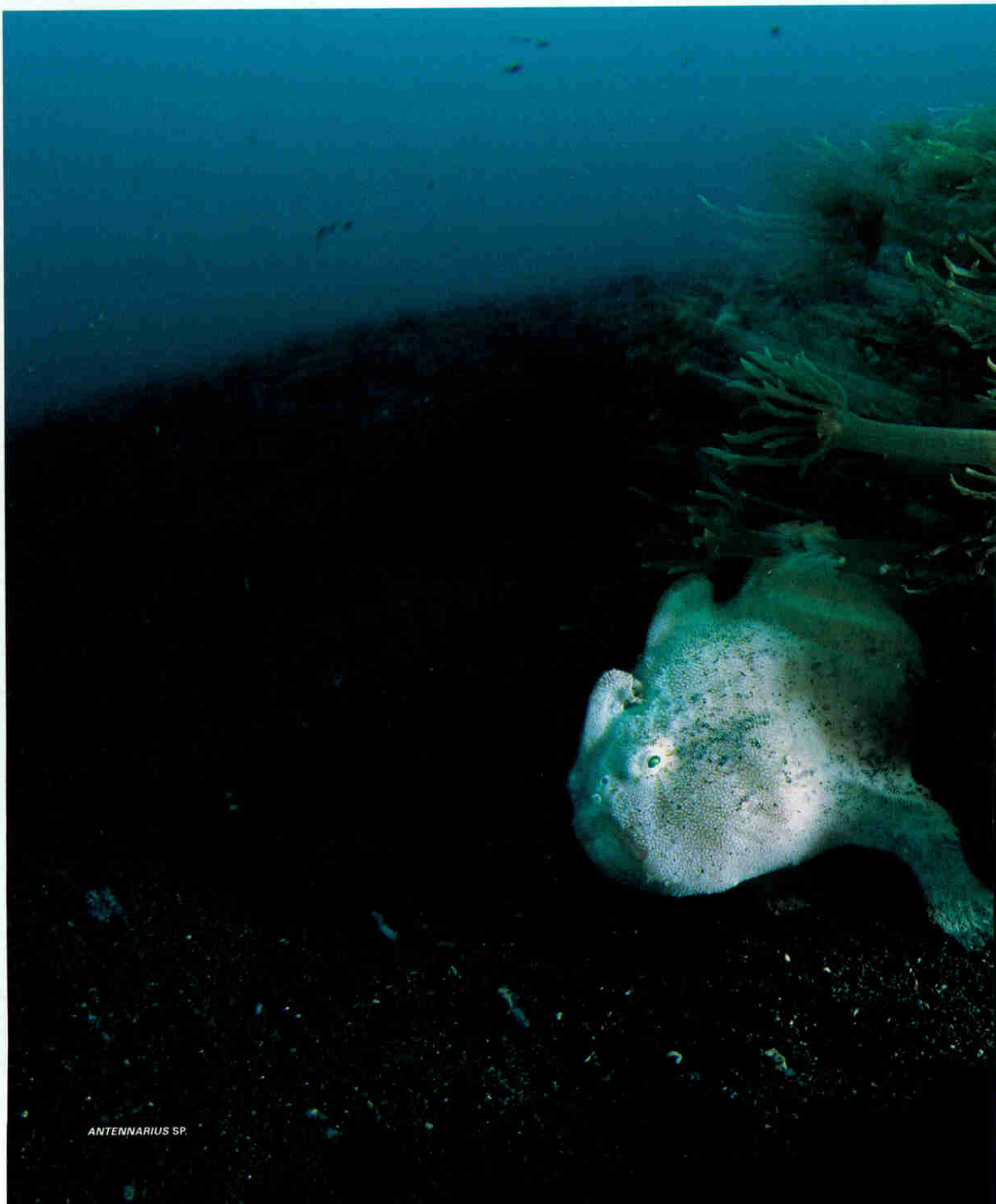
Males are good mothers among members of the jawfish clan (right). Eggs laid by a female are immediately drawn into the male's mouth, where they're not only protected but tended. Periodically he spits out the clutch as a ball, turning it over to give the fry oxygen. When dad needs to eat, he hides the eggs in his burrow. Eye spots on eggs in the mouth of this four-inch-long eyebrow jawfish signal that hatching is about a week away.

No parent stands watch over a flamboyant cuttlefish egg (center), nestled in a fragment of coconut shell and on the verge of hatching. A six-inch-long adult flamboyant cuttlefish (top), hunting along the bottom when it saw me, levitated itself in the water column and flashed every color in its breathtaking palette.

EGG PHOTOGRAPH BY JENNIFER HAYES. CUTTLEFISH: *METASEPIA PFEFFERI;* JAWFISH: *OPISTOGNATHUS* SP.



AN ANGLER LIES IN WAIT



ANTENNARIUS SP.

At twilight the current pushes like a stiff summer breeze, bending soft stalks of daisy coral. Crouching in the lee, a frogfish the size of a child's fist looks as innocent as a bunny. Passing fish learn otherwise. Like all good fishermen, the frogfish, part of the anglerfish group, had found a prime spot and would wait, occasionally extending a wormlike lure on its front dorsal spine to attract prey. But it also has get-up-and-go, able to bump across the sand for hours, poking its head into holes and wiggling its lure. Maybe even fish never know what they'll find in this strange terrain. □

STRAIGHT SHOTS Find more of David Doubilet's photographs, then link to videos of the wunderpus in motion and octopuses moving bipedally, in Learn More at **ngm.com/0511**.

MAURICE, LOUISIANA





As Thanksgiving approaches in Maurice, Louisiana—a hundred miles west of the devastation that befell New Orleans—the owners of Hebert's Specialty Meats are still churning out the turducken: a turkey stuffed with a duck stuffed with a chicken (left). They first started making the poultry trio in 1985, when a local farmer, his own birds in hand, requested the concoction.

70555
Turducken Town

BY CALVIN TRILLIN

PHOTOGRAPHS BY BOB SACHA

If you mention Maurice, Louisiana, to people in the surrounding area, three widely known institutions tend to dominate the ensuing conversation. One of them is Hebert's Specialty Meats, a stuffed-fowl specialist that has become particularly famous in recent years for turducken—a turducken being, whether the laws of nature argue against it or not, a stuffed chicken inside a stuffed duck inside a stuffed turkey. Another is the City Bar, which has been in the hands of the Trahan family since 1927 and employs as its mottoes "World Famous Saloon" and "Not Just a Tradition but a Lifestyle." The third is the Maurice speed trap.

Some residents of Maurice wince when the speed trap is mentioned. Others smile. "You're coming from Lafayette toward the city limits, and you can just see those back lights go on," I was told by one resident, who, even though she has been ticketed herself, couldn't help but grin at the thought of all those city people slamming on their brakes. Although Maurice is mentioned

MAURICE, LOUISIANA





POPULATION: 800
ANNUAL TURDUCKEN SALES: 3,300
COST: $55 each
CALORIES PER 8-OUNCE SERVING: 430
GRAMS OF FAT: 25
STUFFING OPTIONS: alligator, crawfish, shrimp
JUNIOR'S 3-BIRD DE-BONING TIME: 8 minutes
TO MAKE A TURDUCKEN YOURSELF: Allow 2 days

Taking orders is family business for brothers Sammy, at left, and Junior Hebert, owners of Hebert's Specialty Meats. "We sell almost all of our turduckens between Thanksgiving and Christmas," says Junior. "People can't eat like this all the time."

prominently on a website called Speed Trap Exchange, the wincers would say that, strictly speaking, Maurice does not operate a speed trap. The police cruiser is in plain sight—often parked in the median strip of Highway 167, a double lane that, about eight miles south of Lafayette, becomes Maurice Avenue for three miles. The speed limit is well marked—65 down to 55 and then, quickly, down to 40. Also, I was told by officer Marvin Menard, the Maurice policeman who often does the ticketing, many more tickets are given for driving an uninspected vehicle than for speeding. On the other hand, Menard cheerfully acknowledges, he will ticket for any sort of violation. Some people in town refer to Menard as Speedy—although when they're stopped by him, they presumably refrain from using that name or from asking if it's true, as legend has it, that he once ticketed his own mother.

Like the speed trap, if that's what it is, both Hebert's and the City Bar are on 167. In fact, virtually all commercial activity in Maurice is on Highway 167—two other bars and three restaurants, one of which, a po'boy shop called the Villagers Café, serves fried potatoes for which I would risk a costly encounter with Marvin Menard any day of the week. So are both of the Catholic churches, dating back to the days when many small towns in south Louisiana had a diocesan church for white people and a mission church for black people. So is the only stoplight. In fact, for those who visualize a small town as having at its center a compact little shopping district, Maurice might seem less like a town than a stretch of highway. Although there are only 800 people in Maurice—their houses, of a great variety, extend two or three blocks from either side of the highway to the surrounding



STUFF IT Corn bread and pork stuffings—standard options for turducken—dress up the deboned birds.

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SOUTH AFRICAN AIRWAYS



Friends for 30 years, Elaine Broussard and Obey Roy enjoy a Saturday afternoon at Touchet's bar. "People like the place because it's in the country. They can let loose," says owner Calvin Touchet, who took over his father's business with his wife in 1986 when it was a bar, service station, and barbershop. Every other Saturday Touchet's hosts an all-day—and often all-night—Cajun jam session, where the music and food are free (not the drinks). Calvin hopes his hometown keeps growing. "They quit making land, but they haven't stopped making people," he says.

sugarcane fields—it's difficult to imagine anyone walking anywhere.

Maurice must have felt more like a town a few decades ago, before Maurice Avenue got widened into a double lane and before Lafayette began creeping relentlessly along 167 toward the southern border of Lafayette Parish, as if stepping out to the beat of "March of the Strip Malls." Maurice is just over the line, in Vermilion Parish, and traditionally it looked more toward Abbeville—the Vermilion Parish seat, which is about eight miles south—than it did toward the much larger city of Lafayette. Its motto is still "Gateway to Vermilion Parish," but a lot of its residents now get on 167 every morning and drive to work in Lafayette.

The mayor of Maurice, Barbara Picard, who came to town as a bride 50 years ago, told me that when she arrived, the place was populated by people named Picard or Broussard or Trahan or Villien. All of those families are Cajun—descendants of the French settlers driven out of Nova Scotia by the British in the middle of the 18th century who eventually found a home in south-central Louisiana. Until recent years, the way a new house might come to Maurice was that some young Trahan, say, would build on a lot his mother's cousin had inherited years back from a great-uncle named Picard.

Maurice is still palpably Cajun and still full of people living where their families have always lived. The City Bar, now run by the fourth generation of Trahans—Matthew Trahan, who is also chief of the volunteer fire department—is next door to the office of a dentist named David G. Trahan and down the street from Trahan's Barber Shop. One restaurant, Mr. Keet's, got its name because the owner was named Keith, and that comes out Keet in a Cajun accent. Soop's, a restaurant run by the Hebert family next to Hebert's Specialty Meats, has as its chef's special, for $13.95, a classic Cajun mélange: seafood gumbo, shrimp-stuffed bell pepper, crabmeat au gratin, shrimp étouffée, french fried potatoes, green salad, and bread.

But outsiders are coming to Maurice. Its first large subdivision was just completed. Matthew



STITCH IT Once the turducken is put together, it's sewn up, seasoned, vacuum packed, and frozen.

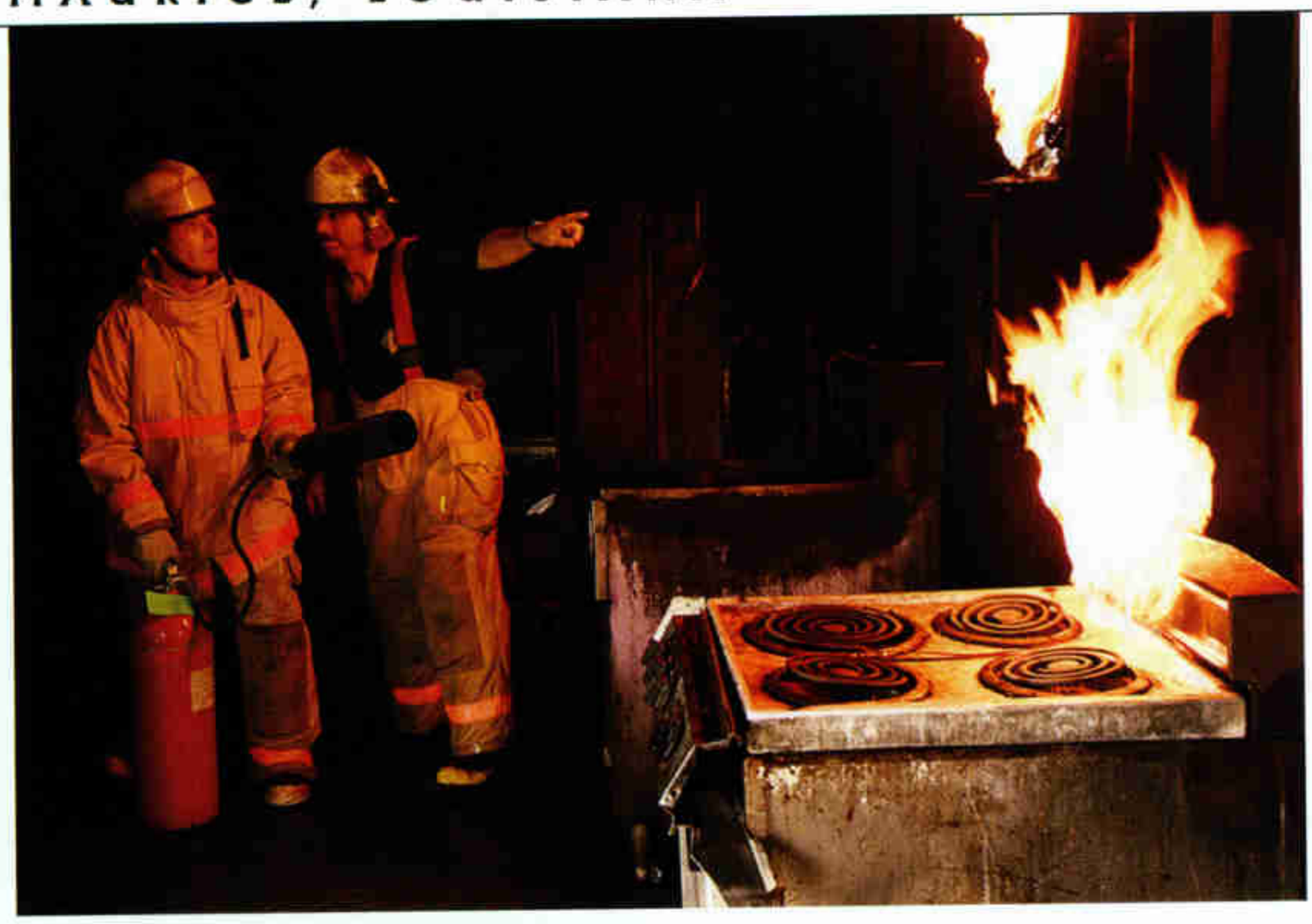


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An intentionally set stove fire helps safety specialist Chris Grossie, at right, teach a student how to tame a flame at Acadian Integrated Solutions. This private emergency training center caters to the nearby offshore oil industry, whose workers occasionally stop off in Maurice to buy holiday turduckens.

Trahan, who used to be able to lead his men to a fire with no more instructions from the dispatcher than something like, "It's out behind Cat Broussard's house," told me that of the 25 or so families who have already moved into the subdivision, he knows only one.

I wouldn't expect him to know a high percentage of City Bar customers. In the morning the people sitting at the bar might be workers on their way home after a couple of weeks on an oil rig in the Gulf of Mexico—City Bar is open from 8 a.m. to 2 a.m., except on Fridays and Saturdays, when it remains open until 3—but at night the crowd runs heavily to young people from the University of Louisiana at Lafayette. Gradually, from the mid-seventies to the mid-nineties, City Bar removed the cardrooms it used to keep for the older gents who would come in from the country on Wednesday nights and Saturday mornings to play booray, a card game much favored by Cajuns. Now it's a large room dominated by beer signs and a couple of pool tables. City Bar still features the Cajun Bloody Mary as its most famous drink, but all I saw anyone drinking was light beer.

Hebert's Specialty Meats remains Cajun enough that co-owner Junior Hebert cooks lunch for the staff and, in his other life, plays the accordion with a Cajun band called Junior Hebert and his Maurice Playboys. Although turduckens have brought it a lot of publicity, Hebert's still describes itself as "Home of Deboned Chicken." During the most recent Christmas week, Hebert's deboned and stuffed 7,500 chickens. People drove to Maurice from all over the area to acquire a bird that was stuffed with corn bread dressing, say, or shrimp and rice dressing, and was about as difficult to carve as a pound cake. The smart ones slowed down at the city limits. □

CAJUN HOW-TO Get step-by-step instructions for making a turducken at home and find other images, resources, and field notes about Maurice, Louisiana, at **ngm.com/0511**.



SLICE IT After four days of thawing in the fridge and five hours in the oven, a turducken goes under the knife.



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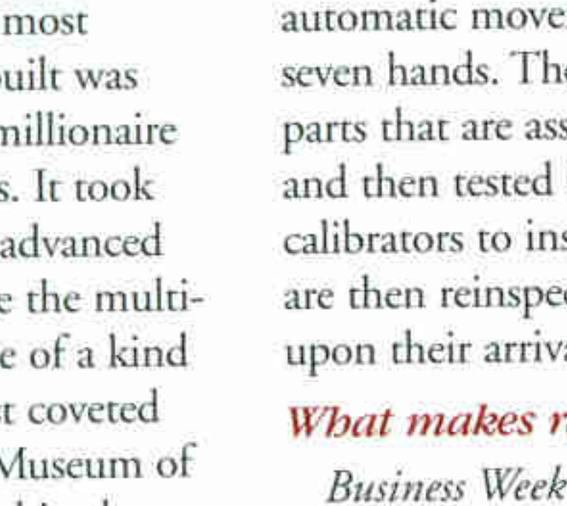
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World's Most Valuable Timepiece Disappears

Back in 1933, the single most important watch ever built was engineered for a quiet millionaire collector named Henry Graves. It took over three years and the most advanced horological technique to create the multi-function masterpiece. This one of a kind watch was to become the most coveted piece in the collection of the Museum of Time near Chicago. Recently this ultra-rare innovation was auctioned off for the record price of $11,030,000 by Sotheby's to a secretive anonymous collector. Now the watch is locked away in a private vault in an unknown location. We believe that a classic like this should be available to true watch afficianados, so Stauer replicated the Graves design in the limited edition Graves '33.

The antique enameled face with four interior dials is true to the original vintage design. But the real beauty of this watch is on the inside. We replicated an extremely complicated early automatic movement with 27 jewels and seven hands. There are over 210 individual parts that are assembled entirely by hand and then tested for over 15 days on Swiss calibrators to insure accuracy. The watches are then reinspected in the United States upon their arrival.



27 jewels and 210 hand-assembled parts drive this classic masterpiece

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Business Week states it best…"It's the complications that can have the biggest impact on price." (*Business Week, July, 2003*). The four interior complications on our Graves™ watch display the month, day, date and the 24 hour clock graphically depicts the sun and the moon. The innovative engine for this timepiece is powered by the movement of the body as the automatic rotor winds the mainspring. It never needs batteries and never needs to be manually wound. The precision crafted gears are "lubricated" by 27 rubies that give the hands a smooth sweeping movement. And the watch is tough enough to stay water resistant to 5 atmospheres. The movement is covered by a 2-year warranty.

Many fine 27-jewel automatics that are on the market today are usually priced well over $2,000 dollars, but you can enter the rarified world of fine watch collecting for under $100. Try the handsome Graves '33 timepiece risk free for 30 days. If you are not thrilled with the quality and design, please send it back for a full refund of the purchase price.

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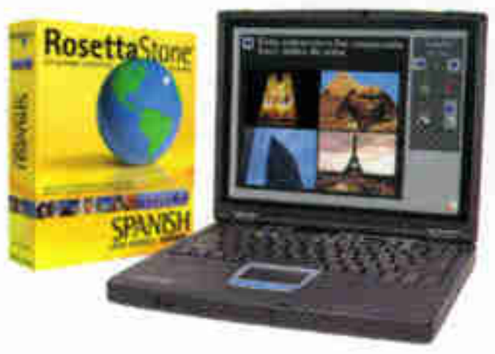
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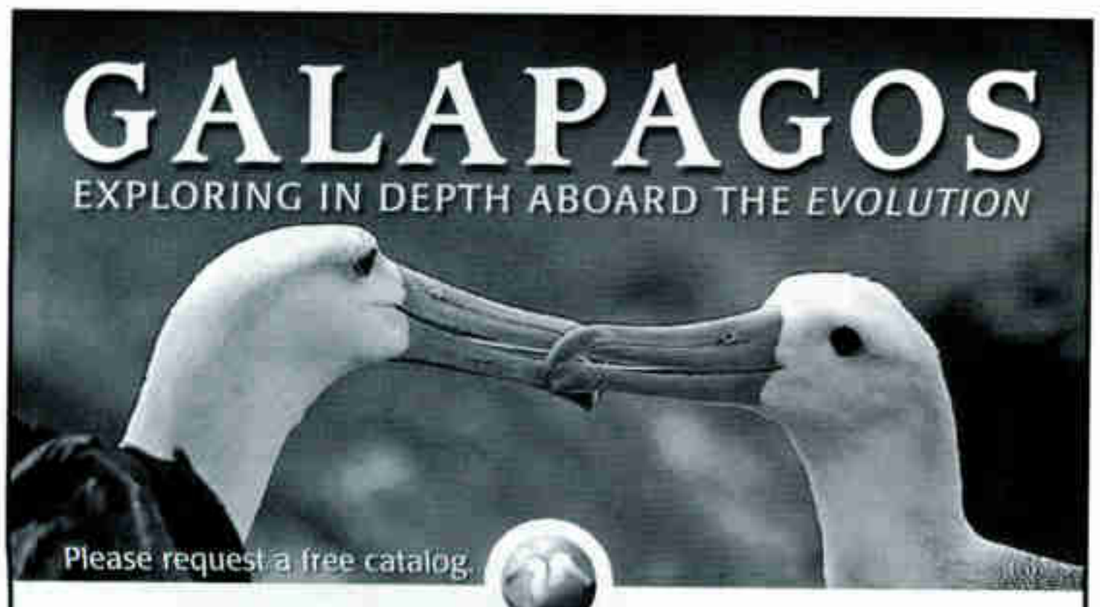
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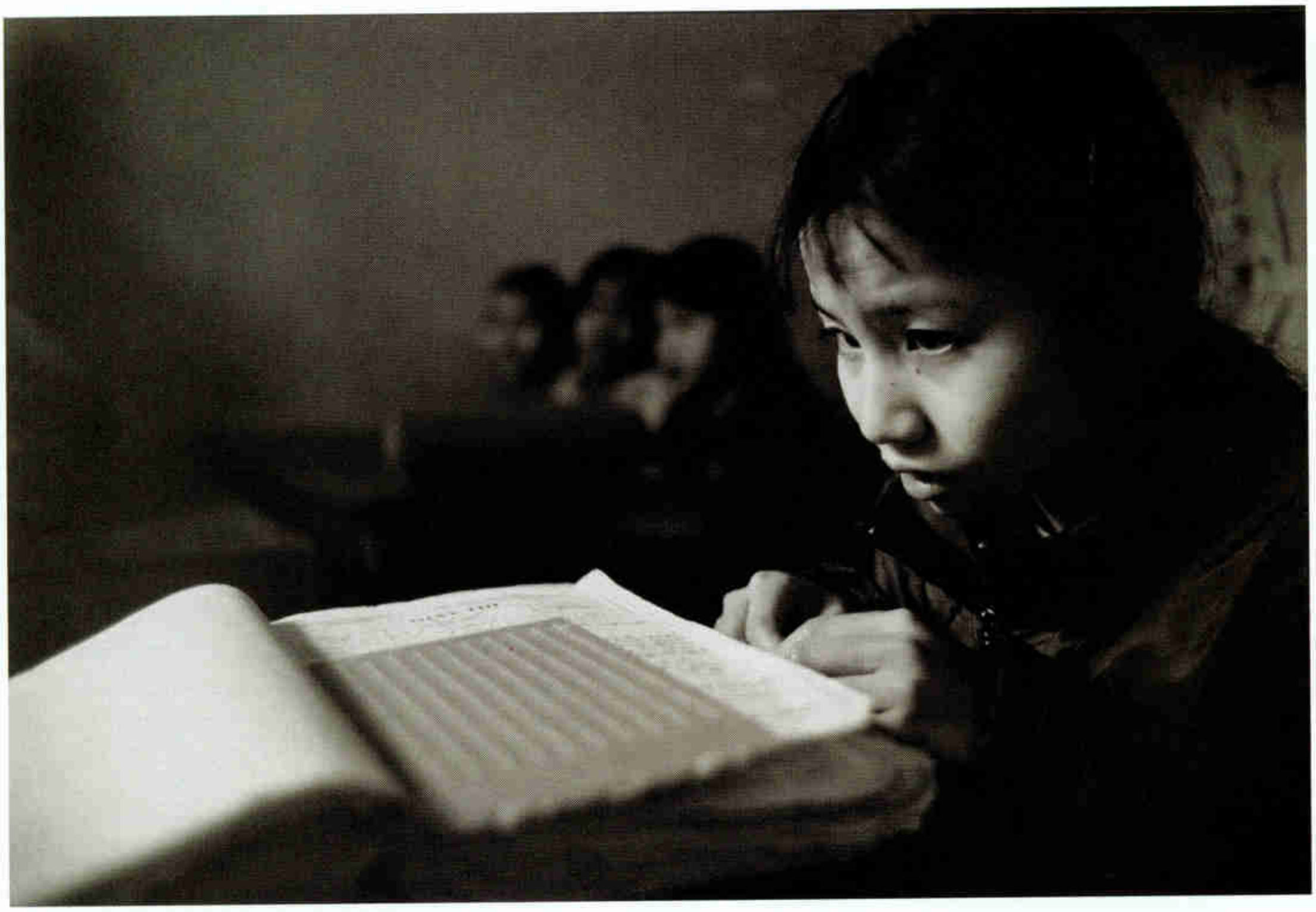
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WAR LETTERS

New Lines of Sight

Sometimes a great photograph just doesn't fit the story for which it was shot. Case in point: Maggie Steber's image of 13-year-old Nguyen Thi Huyen, a student at an orphanage for blind children in a village south of Hanoi. Steber traveled there to photograph Chuck Theusch, a U.S. veteran of the Vietnam War. Theusch corresponded with Vietnamese friends about his project building libraries in Vietnam—including one for blind children—as a way to bring healing between their two nations.

"Originally we thought we would run small photos with each of the portraits to help give a broader sense of the people who wrote the letters," says photo editor Bill Douthitt. "This tender picture brought to light the value of what Chuck is doing there." In the end this image and several others were reluctantly cut.

ONLINE PHOTO GALLERY View Web-exclusive images with tips from photographer Maggie Steber at **ngm.com/0511**.



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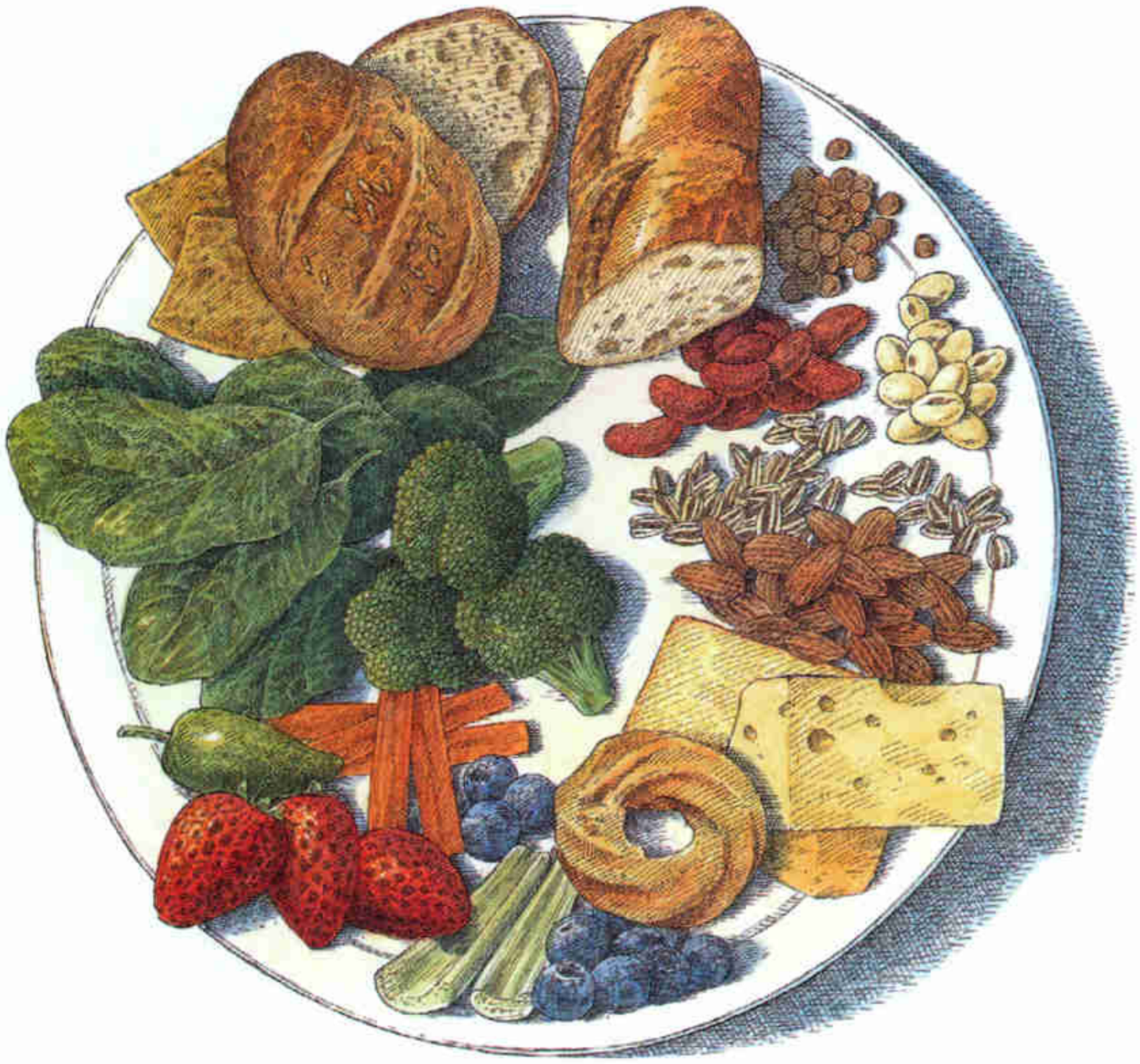


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Do It Yourself

SECRETS OF LONG LIFE (SEE PAGE 2)



Everything but the meat: a sampling of the foods in a vegetarian diet.

Do these foods look familiar?

Except for the meat, a healthful vegetarian diet looks a lot like a healthful omnivorous diet. But vegetarians need to make sure they get enough of the following nutrients, which are more plentiful in animal products.

Protein To add protein without meat, try cooking with tofu or use soy milk in your cereal. Whole grains, beans, seeds, and nuts are also good sources.

Vitamin B_{12} This is a difficult nutrient to get without eating meat. Look for fortified soy products and breakfast cereals.

Calcium Vegetarians can get calcium from spinach, kale, broccoli, almonds, or dairy products.

Iron Avoid anemia; eat lentils. Chickpeas, beans, spinach, bran flakes, and dried fruit are also rich in iron.

Zinc Eating pumpkin seeds, as well as beans and nuts (especially cashews), will give you the zinc your immune system needs.

Go Vegetarian

Compared with meat-eaters, vegetarians experience significantly lower rates of heart disease, some cancers, and other health problems. If you want to give the vegetarian life a try, there's good news: Eating well without meat is easier than ever.

Grocery stores now regularly stock healthful meat alternatives such as tofu, and most restaurants—even steak houses—offer meatless dishes. The illustration above, showing the range of foods a vegetarian might eat in a day, should reassure you that you'll find plenty to eat even without red meat, fish, or fowl.

Many vegetarians avoid eating meat for personal moral reasons. Even if you don't wish to cut out meat entirely, you can still reap the health benefits of a plant-based diet, says Katherine Tallmadge, spokeswoman for the American Dietetic Association. Plant-based diets include some lean meat but mostly comprise whole grains, fruits, vegetables, and legumes.

Key to any healthful eating plan is balance and variety. Experiment. Cookbooks and websites to help you abound. A good place to start is the USDA's vegetarian resource list: *nal.usda.gov/fnic/pubs_and_db.html.*

3 MINDS

This trio of veggie eaters didn't live forever, but they sure got a lot done while they were alive.

- **Henry Ford** The auto pioneer advocated soy for use in both his vegetarian diet and his cars.
- **Benjamin Franklin** This founding father gave up meat for a time, in part to save money.
- **Leonardo da Vinci** A vegetarian on moral grounds, the Renaissance man bought animals in *order to free them.*

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ART BY JOHN BURGOYNE



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Flashback



Working as an American Red Cross volunteer during World War I, Grace Vanderbilt collected soldiers' mail.

WAR LETTERS

Grace During Wartime

Helping soldiers in a Washington, D.C., train yard in 1917 might have made Grace Vanderbilt feel closer to her own military man. Her husband, Cornelius Vanderbilt III, was serving in Europe as commander of the 102nd Engineers Division. His war honors would soon include a Distinguished Service Medal.

Cornelius, known as Neily, was disinherited for marrying Grace. His father, millionaire railroad magnate Cornelius Vanderbilt II, objected to the "older woman," who was indeed his son's senior—by three years. Neily's brother eventually restored the inheritance; the couple's marriage lasted throughout their lives. *—Margaret G. Zackowitz*

FLASHBACK ARCHIVE All the photos plus e-greetings, in Fun Stuff at **ngm.com/0511.**

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